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WESTERN AMERICANA

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THE YOSEMITE FALLS AND VALLEY, CALIFORNIA.

Falls 2,700 feet in height. First fall 1600 feet. Second Fall 700 feet. Lower Fall 400 feet.

EMINENT AMERICAN EXPLORERS AND ARTISTS.

1.—Gen. Custer. 2.—Gen. Fremont. 3.—Lieut. Wheeler. 4.—Prof. F. V. Hayden. 5.—Albert Bierstadt.
6.—Maj. J. W. Powell. 7.—Thomas Moran.

THE GREAT WEST:

Its Attractions and Resources.

CONTAINING A POPULAR DESCRIPTION OF THE MARVELLOUS SCENERY, PHYSICAL
GEOGRAPHY, FOSSILS, AND GLACIERS OF THIS WONDERFUL REGION;

5-9822

AND THE

RECENT EXPLORATIONS IN THE YELLOWSTONE PARK,
"THE WONDERLAND OF AMERICA,"

BY

PROF. F. V. HAYDEN, LL.D.,
FORMERLY UNITED STATES GEOLOGIST.

ALSO,

VALUABLE INFORMATION TO TRAVELLERS AND SETTLERS CONCERNING
CLIMATE, HEALTH, MINING, HUSBANDRY, EDUCATION,
THE INDIANS, MORMONISM, THE CHINESE;

WITH THE

Homestead, Pre-emption, Land, and Mining Laws.

BY

A CORPS OF ABLE CONTRIBUTORS.

HANDSOMELY ILLUSTRATED WITH ENGRAVINGS AND MAPS.

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NOTE BY THE PUBLISHERS.

The rapidity with which the far Western portion of our country has been explored and mapped, and the extraordinary changes made by bringing the vast Plains—but lately the roving-grounds of wild Indians and herds of buffaloes—into cultivation, furnishing flourishing and happy homes for hundreds of thousands of the restless population of the East or of Europe, are facts that have excited the astonishment of the world.

Immigration has been, and is now, advancing with a ceaseless current, impelled by various motives. Some of the individuals composing this great army are actuated by a thirst for gold, excited by the marvellous stories of the wealth hidden in the rocks and ravines of the mountains; others, moved by reports of the cheapness and fertility of the land and the salubrity of the climate, and undazzled by the stories of gold and silver deposited centuries ago to be excavated by this generation, decide on the wiser course of cultivating the earth. To these two great motives are added many that bring the merchant, the speculator, the schoolmaster, and others that follow in the train of immigration.

To no one is the country more indebted for opening up this formerly unknown land to the settler than to Professor F. V. Hayden, who for nearly thirty years has been engaged in the great work of scientific exploration. Professor Asa Gray, Professor of Natural History in Harvard University, and America's most eminent botanist, says: "It has come in my way to know a good deal about Dr. Hayden's Territorial surveys for several years past, especially as to their scientific results; and of late my attention has been still more called to them. I wish here not only to express, emphatically, my own opinion of their great value and of the importance of continuing them, but also to testify to the deep im-

0113 R. M.
Bklm. Mar. 2-10-36

pression they are making upon the scientific world. In Europe the learned societies, the scientific journals, as also the working naturalists in correspondence, speak with one accord in terms of admiration, not unmixed with envy, of what our government has done and is doing in this regard; and I observe that Dr. Hayden's survey and the resulting publications are put forward as the type and exemplar."

From a letter of Baron von Richtofen, President of the Berlin Geographical Society, we extract the following: "Your eminent exploring work, the energy with which you have conducted it, and your faculty of managing the working-power of a large staff so as to arrive at its full efficiency and to put every man in his proper place, have earned for you the admiration and praise of the scientific world in general and many eminent men in particular."

These two extracts from numerous notices of the kind, and the fact that Dr. Hayden has been made an honorary member of very many of the principal scientific societies of Europe and other foreign countries, prove how eminently qualified he is for the great task of his life.

The matters pertaining to the historical, agricultural, mining, and other departments of the various countries described have been also confided to writers of eminent ability, who have, by reason of long residence and careful study, made themselves well qualified for the task.

We would here also express our grateful acknowledgments to the New York *Independent*, New York *Tribune*, and the governors and other officials of the various States and Territories, for documents containing the latest information and placed in our hands for publication.

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THE FAR WEST.

BY HENRY WADSWORTH LONGFELLOW.

FAR in the West there lies a desert land, where the mountains
Lift, through perpetual snows, their lofty and luminous summits.
Down from their jagged, deep ravines, where the gorge, like a gateway,
Opens a passage rude to the wheels of the emigrant's wagon,
Westward the Oregon flows, and the Walleway and Oyhee
Eastward, with devious course, among the Wind River Mountains;
Through the Sweetwater Valley precipitate leaps the Nebraska;
And to the south, from the Fontaine-qui-bout and the Spanish sierras,
Fretted with sands and rocks, and swept by the wind of the desert,
Numberless torrents, with ceaseless sound, descend to the ocean,
Like the great chords of a harp in loud and solemn vibrations.
Spreading between these streams are wondrous, beautiful prairies,
Billowy bays of grass ever rolling in shadow and sunshine,
Bright with luxuriant clusters of roses and purple amorphas.
Over them wander the buffalo herds and the elk and the roebuck;
Over them wander the wolves and herds of riderless horses;
Fires that blast and blight, and winds that are weary with travel;
Over them wander the scattered tribes of Ishmael's children,
Staining the desert with blood; and above their terrible war-trail
Circles and sails aloft, on pinions majestic, the vulture,
Like the implacable soul of a chieftain slaughtered in battle,
By invisible stairs ascending and scaling the heavens.
Here and there rise smokes from the camps of these savage marauders;
Here and there rise groves from the margins of swift-running rivers,
And the grim, taciturn bear, the anchorite monk of the desert,
Climbs down their dark ravines to dig for roots by the brookside;
While over all is the sky, the clear and crystalline heaven,
Like the protecting hand of God inverted above them.

THE GREAT WEST.

THE GREAT WEST.

BY PROF. F. V. HAYDEN, U. S. GEOLOGICAL SURVEY.

NEVER in the history of our country has the term "the Great West" possessed so much significance as at the present time. Forty years ago, Ohio, Indiana, and Illinois were called the far Western States, while but little was known of the vast regions beyond; now farms, villages, and cities, with the sites of future cities, are dotted over the plains and mountain-slopes as they stretch westward toward the setting sun.

At the very threshold of our undertaking it is proper that we should make some inquiry into the extent and capacities of this great country, and into the physical causes that have produced its present configuration. If we examine any good geographical map of our country, we shall see at a glance that at least two-thirds of the United States of America, an area of more than two millions of square miles, lie west of the Mississippi River. In the portion lying east of that river, and containing less than half that area, now dwell between thirty and forty millions of people. The Atlantic coast, with its crowded population, its refined civilization, its great cities, its seats of learning and industrial operations, forms only a fringe on the eastern border of this vast continent.

It was not until within the present century that the country possessed any very definite knowledge of the geography of the mountain-regions of the Far West. Upon the old maps the mountain-ranges were shown by a single line of hatchings, with a few minor ranges branching off, the whole trending nearly north and south, or rather west of north and east of south.

The first important government expedition that was sent out to explore the great unknown mountain-regions of the extreme West was that of Lewis and Clarke, which in 1804–6 passed up the Missouri River to its source, crossed the main Divide of the Rocky Mountains, and followed the Columbia River to its entrance into the Pacific Ocean. Although this expedition was a great and successful achievement in a geographical point of view, taking into consideration the time and the means at its command, yet much of the information it obtained was very vague, and limited to a narrow belt across the northern portion of the country. Lewis and Clarke, however, fixed pretty well the positions of the Missouri and Columbia Rivers. The two volumes which contain the result of these explorations, although possessing the intrinsic evidence of having been written with the utmost candor and truthfulness, read like a romance. The party was small and comparatively unprotected, the country utterly unknown, and occupied only with tribes of Indians, many of whom were inclined to be hostile. Every item of information which they secured was new and strange, and of the highest interest.

The next explorer was Major Z. M. Pike, who in 1805–7 crossed the country farther south, and discovered the head-waters of the Arkansas River and the lofty peak which now bears his name. He crossed the Divide into the Great Basin. In 1819–20, Stephen H. Long was sent out by the government with a well-equipped party, comprising not only topographers, but also geologists and naturalists, among whom was the celebrated Thomas Say. After Long came Bonneville, Ross Cox, Schoolcraft, Nicollet, Fremont, and others, all of whom added more or less to the store of knowledge of this great area. From 1844 to 1860 more than twenty expeditions were sent out by the government with the object of determining the best route for a railroad to the Pacific. In 1853, Congress passed a bill making appropriations for the determination of the most practicable route for a railroad from the Valley of the Mississippi to the Pacific coast. No expense was spared in equipping expeditions, which traversed the country from east to west at various points from latitude 49° to the southern boundary of the United States. The information thus obtained was embraced in a large series of maps and reports, which were published by the general government. Although so very much had been done toward the development of the resources of the great West, yet prior to 1868 no important portion had been examined with such care and detail as to render the maps anything more than approximately correct. The information thus obtained could only be placed on a map projected on a small scale, where an error of five or ten miles would be overlooked. Within the past ten or twelve years several expeditions have been organized, under King, Wheeler, Powell, Hayden, and others, with the object of working out certain areas with considerable detail, including topography, geology, and natural history; and more definite knowledge of the remote West has been obtained within that period than in all the previous years. Indeed, the period from 1868 to 1878, inclusive, will ever be regarded in the history of our country as the true era of scientific exploration in the West.

THE TWO MOUNTAIN-SYSTEMS.

According to Professor J. D. Whitney, two great ranges of mountains form the skeleton of the North American continent—viz. the Appalachian and the Cordilleras. The Cordilleras ranges border on the Pacific coast, extending southward to Patagonia, being so depressed at the Isthmus of Darien as to seem almost interrupted or broken for a time. The term "Cordilleras" has been adopted by Professor Whitney for the series of mountain-ranges bordering the Pacific, extending from Mexico northward into British America. The term "Rocky Mountains" is limited so as to embrace only those numerous ranges that lie east of the Great Basin, and really form the watershed of the continent. The name "Rocky Mountains" has been applied indefinitely to an extended series of mountain-ranges west of the Mississippi, of a great variety of form and structure. The term "Stony Mountains" was originally used, apparently with no intention of applying it to any one range or group of ranges. This term probably suggested itself to the earliest travellers on account of the vast masses of débris or loose, broken masses of rock which cover all the ranges from base to summit. This is made more conspicuous by the general absence of timber. From the eastern slope westward we pass over range after range to the Pacific coast for a thousand miles or more, interspersed here and there with a valley or park. The greatest width of the mountain-system lies between parallels 38° and 42°. Here the mass of the mountains is a thousand miles or more in breadth, though the entire country west of the Mississippi, embracing an area of over two millions of square miles, has been influenced by the mountain-ranges, and may therefore be called the "mountain-region." The great group of the Cordilleras extends southward through Mexico and Central America to the Isthmus of Darien, and northward into British America and Alaska to the Arctic Ocean. The great chain of the Andes of South America is an extension southward of the same group, and in a general view they all belong to one great system. The principal ranges on the Pacific coast are the Sierra Nevada and the Coast Ranges, while to the eastward, in the interior basin, are numerous smaller ranges. The Wahsatch range forms the eastern wall of what may be called the main Cordilleras group or Pacific Coast Mountains. The great group of mountains which forms the backbone or watershed of the continent may be denominated the Rocky Mountain group as a sub-generic term. We shall note hereafter the influence which these mountain-ranges have exerted upon the destiny and resources of this great country.

GENERAL DIVISIONS.

Having given in the preceding pages a brief outline of the surface character of the great country west of the Mississippi, we shall find it an interesting subject of study to inquire into the plan of the growth and development of this vast region.

The great area west of the Mississippi seems to have been at one time an enormous plateau, out of which were evolved the different ranges of mountains, as if they had been thrust up by some volcanic force. Let the traveller pass southward from Cheyenne to Denver, along the immediate base of the eastern range; he will find that the mountains of which the snow-covered summits of Pike's and Long's Peaks form a part rise rather abruptly out of what appears to the eye an almost level prairie-region, and will see the inclined ridges of the various sedimentary formations elevated to view, as if the huge granite nucleus had been thrust up, leaving upon its sides the sandstones and limestones of the more modern beds. These magnificent scenes at once fill the thoughtful mind with wonder and delight, and the first inquiry is as to the manner in which these stupendous changes have been brought about.

In general terms, we may divide the country west of the Mississippi into mountain and prairie, or "plains." This latter term may be regarded as the more comprehensive one, including in the mind of the Western people the numerous parks and basins among the mountains. The prairie country refers more especially to the vast grassy, treeless plains of the eastern slope. To understand more clearly the original plateau character of this region, we have only to examine the numerous barometrical profiles which have already been constructed across the continent for railroad and other purposes. The explorations made in past years under the direction of the War Department, and those more recently for the different lines of rail-routes, afford ample means for its study to the traveller. If we proceed westward from any point along the Missouri or Mississippi River, we will find that the ascent is gradual, at first not more than one foot per mile, but steadily increasing until we reach the base of the mountains, when the ascent is fifty to one hundred feet per mile. The profile of the Pacific Railroad shows that Omaha, on the Missouri River, is 1060 feet above sea-level, while at Columbus, 91 miles by rail westward, the elevation is 1470 feet, showing an ascent of about four and a half feet per mile. At Cheyenne, 516 miles west of Omaha, the elevation is 6075 feet, showing an ascending grade from Omaha of nearly ten feet per mile. This entire distance is over an apparently level plain, most of the way by the valley of the Platte River. From Cheyenne to the highest point along the line of the railroad, at Sherman, 8271 feet, the distance is 33 miles, when suddenly the grade increases to over sixty-six feet per mile. From thence across the continent are numerous ranges of mountains, with valleys of greater or less area intervening, with a general elevation varying from 4000 to 6000 feet; whence the descent to the Pacific is somewhat rapid and abrupt. The profile of the Kansas Pacific Railroad from Kansas City, on the Missouri River, to Denver, Colorado, shows similar results. At Kansas City the elevation is 764 feet, at Denver, 639 miles westward, 5197, making an average ascent of nearly seven feet per mile across an apparently level, treeless plain. A few miles west of Denver the great Colorado or Front Range seems to rise abruptly out of the plains, its summits reaching the line of perpetual snow. Similar results will be found by examining the profile of the Northern Pacific Railroad route anywhere between the meridians of 45° and 48° to the Pacific coast. Indeed, there appears to have been a gradual expansion of the earth's crust until it yielded, revealing the vast mass of mountain-ranges which extend across the continent. The details of the causes of these phenomena, and the varied conditions under which they have occurred, are too extended for such an article as this.

The great mass of the mountain-ranges lie west of the 105th meridian; the united groups trend about 20° west of north. Along the eastern slope the smaller or minor ridges have a trend more to the northwest, so that they constantly die out in the plains, giving to the eastern side an *echelon* appearance. As the small ridges run out, they terminate frequently in a perfect example of an anticlinal, as may be seen near Cache-la-Poudre River. From the notches in the outline of the ranges the Platte, Arkansas, and many other rivers open into the plains. About the sources of the Missouri River the main chain is nine degrees of longitude farther west than in Colorado. In this broad space, and to the eastward, are numerous outliers, as the Black Hills, Big Horn, Bear's Paw, Judith group, etc., all more or less distinctly connected with the main chain. The Black Hills are connected with the Laramie range near the Red Buttes by an anticlinal valley, while the Big Horn is related in the same way, showing that all these apparently isolated ranges are due to one uniform cause and were elevated at about the same time.

MOUNTAIN-RANGES ON THE EASTERN SLOPE.

It may not be out of place here to describe briefly some of the mountain-ranges on the eastern slope, which have already attracted much attention, and will receive far more from the public at no distant day. The Black Hills of Dakota, which of late years have received such a large share of public attention on account of the discoveries of valuable gold-mines within their limits, are located mostly in Dakota Territory, between the 43d and 45th degrees of latitude and 103d and 105th degrees of longitude, and occupy an area about one hundred miles in length and sixty in breadth. According to General Warren, the shape of the mass is elliptical, and the major axis trends about ninety degrees west of north. The base of these hills is from 2500 to 3000, and the highest point is about 7000 or 8000 feet, above sea-level. The whole range is embraced, as it were, within the forks of the Cheyenne River, called the North and South Branches, which, united, constitute the most important stream flowing into the Missouri River from the south side. The North Branch passes along the northern side of the range, receiving very many of its tributaries and most of its waters from it, but takes its rise far to the west of the range, near the source of Powder River, in the "divide" between the waters of the Yellowstone and those of the Missouri. The South Branch also rises in the same divide, flowing along the southern base of the range, and also receives numerous tributaries which have their sources in it. These two main branches unite about thirty miles east of the Black Hills, forming the Big Cheyenne, which flows into the Missouri about sixty miles above old Fort Pierre. The Moreau, Grand, Cannon Ball, and other rivers flowing into the Missouri north of the Cheyenne and south of the Yellowstone rise in a high Tertiary divide north of the Black Hills, and are for the greater part of the season quite shallow, and sometimes nearly dry; but the Little Missouri derives a portion of its waters from the Black Hills through a number of small branches which flow from the north-western slope.

We thus see that the Black Hills do not give rise directly to any important stream, if we except the Little Missouri, a few branches of which flow from springs near the base of the hills, affording but a comparatively small supply of water from that source.

Besides the mineral resources of the Black Hills, which of late years have turned out to be so valuable, the timber as well as the agricultural and pastoral capacities are important. All around the base are fertile lands, and among the Hills are large open areas which afford most excellent feeding-grounds for stock. As we have previously remarked, these Hills occupy an area about one hundred miles in length and sixty in breadth, or 6000 square miles. Nearly one-third of this area, or about 2000 square miles, is covered to a greater or less extent with pine timber. Since the settlement of this country demands these resources, the facilities for transportation of this timber over the treeless portions of the plains will be provided, and the importance of these forests cannot be over-estimated. The dark appearance which the dense forests of pine timber give to the Black Hills at a distance has given origin to their name.

The geological structure of the Black Hills may be briefly mentioned in this connection. The nucleus or the central portion is composed of red feldspathic granite, with a series of metamorphic slates and schists superimposed, and thence, upon each side of its axis of elevation, the various fossiliferous formations of this region follow in their order to the summits of the Cretaceous, the whole inclining against the granitoid rocks at a greater or less angle. There seems to be no marked unconformability in the fossiliferous rocks, from the Potsdam inclusive to the top of the Cretaceous. From these facts we draw the inference that prior to the elevation of the Black Hills—which must have occurred after the deposition of the Cretaceous rocks—all these groups of strata presented an unbroken continuity over the area occupied by these mountains. If this conclusion is a correct one, it will have an important bearing on the physical history of many of the minor ranges of mountains on the eastern slope. It will also enable the geologist to form an approximate estimate of the amount of erosion that has taken place since these minor mountain-groups began to rise above the general level of the plains.

Proceeding in a south-west direction from the Black Hills, we find there are ample proofs of the connection of these hills with the Laramie Mountains through a low anticlinal, which can be followed for many miles. It is sometimes concealed by the recent Tertiary beds, but it reappears at different points. By the Laramie Mountains we designate that group of ranges which extends from the Red Buttes southward to the Arkansas River. This group, when examined in detail, is found to be composed of a large number of smaller ranges—all, as far as I have observed, of the true granitic type. The trend of the whole group is very nearly north and south—northward as far as Fort Laramie, where it makes an abrupt flexure around to the west and north-west, and gradually ceases or dies out at the Red Buttes. From this point westward and northward there is a space from twenty to forty miles in width destitute of mountain-elevations, though the strata exhibit evidences of dislocations or crust movements.

The Laramie range is also composed geologically of a granitoid nucleus, with the fossiliferous formations—Silurian, Carboniferous, Jura-Trias, Cretaceous, and in many places the Lignitic Tertiary—inclining from each side of a central axis at various angles. It is from these mountains that the numerous branches of the Platte River have their sources, extending a distance of nearly four hundred miles. From the observations which I have made in this range, it seems to me the conclusion is plain that all the above-named rocks, in a nearly or quite horizontal position, were some time during the Tertiary period continuous over the whole area occupied by them at the present time.

The most important outlier of the Rocky Mountains on the eastern slope is the Big Horn range, which, though somewhat irregular in the shape of its mass, has a general trend nearly north-west and south-east. It occupies an area about one hundred miles in length and fifty in breadth. Near latitude 43½° and longitude 102° the line of fracture seems to have partially died out toward the south and south-east, and to have made a gradual flexure around to the west, the whole range soon losing its granitoid character in the volcanic groups near the Wind River group.

At the southern end of the Big Horn range we can trace a single low anticlinal across the prairie, connecting these mountains with the Laramie range at the Red Buttes on the North Platte River. They also form a connection with the Wind River Mountains. The central portion of these mountains is also composed of granitic rocks, with the same series of sedimentary beds turned from either flank, inclining at various angles from the axis of elevation, as is seen around the Black Hills and the Laramie. Some of the more lofty peaks are from eight to twelve thousand feet high, and are covered with perpetual snow. We may say again, in this connection, that the evidence seems conclusive that up to the time of the accumulation of a large portion of the Lignite beds at least, all these formations, from the Silurian to the true Lignite strata, inclusive, were in a horizontal position, extending continuously over the whole area occupied by the mountains, but as they were slowly elevated the central portions were removed by the erosive action of water.

Like the Black Hills, the Big Horn range does not give rise to any important sub-hydrographical basins. The largest stream in this region, and one which gives name to the mountains, rises in the Wind River range, passes through the Big Horn Mountains, and unites with the Yellowstone about seventy miles to the northward. Before reaching the mountains it takes the name of Wind River, and assumes the name of Big Horn after emerging from them. This range constitutes quite an important feeder of the Yellowstone. Powder River, which rises in this range by numerous branches, drains a large area, mostly lignitic Tertiary, and pours a considerable volume of water into the Yellowstone near longitude 105½° and latitude 46½°. Tongue River is the next most important stream, which, though not draining so great an area, empties into the Yellowstone a much larger volume of water.

Near the junction of the Popo Agie with Wind River we come in full view of the Wind River Mountains, which form the dividing crest of the continent, the streams on the one side flowing into the Atlantic and those on the other into the Pacific. This range is also composed to a large extent of red and gray feldspathic granite, with the fossiliferous rocks inclining from the eastern side. The great Teton range is formed mostly of granitic rocks, though intersected with dykes of trachyte. Basalts are found on the plains to a greater or less extent, in Pierre's Hole, Jackson's Hole—broad oval parks or basins among the mountains. On Snake River the ancient volcanic rocks seem to have been poured out over the country, and to have cooled in layers, thus giving to great thicknesses the appearance of stratification.

THE SOURCES OF THE YELLOWSTONE AND MISSOURI.

The mountains about the sources of the Missouri and Yellowstone Rivers are largely of eruptive origin. Enormous gorges have been worn through two to three thousand feet in thickness of volcanic breccia, exposing nearly vertical walls on either side. Probably nowhere on the continent can be found more striking proofs of volcanic action, and it appears to have occurred at a modern date, in a geological sense. Here and there, however, are mica and clay-slates, also feldspathic granites, rising from beneath the eruptive layers and inclining at various angles. One of the most extraordinary features in the region about the sources of the Yellowstone are a series of what appear to be stratified rocks, composed of volcanic products, which were thrown out of the earth's interior during the remarkable period of volcanic activity, the remains of which are now seen in the numerous geysers and hot springs that have given such celebrity to the country. These volcanic products seem to have been thrown out into water, and afterward redistributed in the form of strata of breccias, conglomerates, tuffs, and sandstones. Along the

East Fork of the Yellowstone River, and in the Gallatin range, about the sources of Cañon and Boulder Creeks, these beds reach a thickness of from three to five thousand feet. Among the breccias are found remarkable specimens of silicified wood. Trunks of trees several feet in diameter, and in one instance twelve feet in length and ten feet across, occur in an upright position. Prostrate trunks of trees fifty to sixty feet in length and five to six feet in diameter are not uncommon. Mr. W. H. Holmes, who was a member of the United States Geological Survey of the Territories in charge of Dr. Hayden, made an examination of these curious trees in the Yellowstone Park. From an article in the *Bulletin* of the survey, February, 1879, I make the following extracts, which must be read with deep interest:

"The standing trunks are generally rather short, the degradation of the compact enclosing strata being so slow that the brittle trunks break down almost as fast as they are exposed. In many cases the roots are exposed, and may be seen penetrating the now solid rock with all the original ramifications. One upright trunk, of gigantic proportions, rises from the enclosing strata to the height of twelve feet. By careful measurement it was found to be ten feet in diameter, and as there is nothing to indicate to what part of the tree the exposed section belongs, the roots may be far below the surface, and we are free to imagine that there is buried here a worthy predecessor of the giant *Sequoias* of California. Although the trunk is hollow and partly broken down on one side, the woody structure is perfectly preserved, the grain is straight, and the circles of growth distinctly marked. The bark, which still remains on the firmer parts, is four inches thick, and retains perfectly the original deeply-lined outer surface. Specimens of the wood and bark were collected, but no microscopic examinations have been made. It is clear, however, that the tree was not a conifer. The strata which enclose this trunk are chiefly fine-grained greenish sandstones, indurated clays, and moderately coarse conglomerates. They have been built around it as it stood in comparatively shallow but doubtless quiet waters. As would naturally be expected, these strata contain many vegetable remains: branches, rootlets, fruits, and leaves are extensively enclosed. One stratum of sandstone that occupies a horizon nearly on a level with the present top of the giant tree contains a great variety of the most perfectly preserved leaves. Such specimens as we were able to bring away with us have been submitted to Professor Leo Lesquereux for identification. They are found by him to belong to the Lower Pliocene or Upper Miocene, and correspond in a number of their species with the Chalk Bluffs specimens of Professor Whitney. . . . .

"As far above the leaf-bearing horizon as I was able to ascend the silicified trunks were very numerous and well preserved, and by the aid of a field-glass others could be detected in all parts of the cliff to the highest stratum.

"At another point, nearly a mile farther east, I climbed the rugged walls of the mountain for the purpose of examining a number of large trees that were visible from below. Trunks and fragments of trunks were found in great numbers and in all conceivable positions. In most cases the woody structure is well preserved; the trunks have a tendency to break in sections, and on the exposed ends the lines of growth, from centre to circumference, can be counted with ease. In many cases the wood is quite completely opalized or agatized, and such cavities as existed in the decayed trunks are filled with beautiful crystals of quartz and calcite. Our party was so fortunate as to procure some very handsome specimens of amethyst and ferruginous quartz. It is a matter worthy of observation that nearly all of the beautiful crystals that occur so plentifully in this region have been formed in the hollows of silicified trees. The same fact has been noticed in regard to similar crystals in many parts of the West, and notably in the case of the smoky quartz of the Pike's Peak region in Colorado.

"The silicifying agents have been so unusually active in the strata of the volcanic Tertiary that not only are all organic remains thoroughly silicified, but all cavities in the loosely-bedded rocks and all fracture-lines in the strata are filled with chalcedony or other forms of quartz.

"On reaching the heavily-bedded conglomerates of the upper third of the cliff, I found the trees still more perfectly preserved. Many of the trunks are twenty and thirty feet in height. Their roots are in most cases imbedded in the layers of finer-grained materials in which they grew, while the battered and branchless trunks are encased in the coarse conglomerates and breccias. These latter rocks are composed chiefly of basaltic fragments, many of which are of great size; there is, however, always enough tufaceous and other fine-grained material to fill in the interstices and act as a cement. These beds are massive and irregular, and seem to have accumulated too fast to be thoroughly redistributed by the waters. Only the stronger trees of the forest seem to have withstood the fierce storms of rocks that must have prevailed at the period of their entombment, as the smaller trunks and branches are prostrate or totally destroyed. In most cases where upright trunks penetrate the entire thickness of an enclosing bed, the tops may be seen to terminate with the upper surface of that bed, as if causes had acted at the beginning of the deposition of the succeeding stratum to plane down the irregularities of the old surface. In due course of time this succeeding stratum produced its growth of forest, which followed its many predecessors into the subterranean depths, and in its turn was buried by the rapidly-accumulating conglomerates. This remarkable alternation of events seems, in a general way, to have been kept up from the beginning to the end of the period.

"The very precipitous character of the cliffs prevented me from reaching the upper part of the wall at this point, but I succeeded in making my way to the summit of the mountain at two other points, and found that everywhere the section was practically the same.

"On the opposite side of the valley the same conditions were observed: the fossil trees occur at the highest point reached—three thousand feet above the river. The ranges that form the rim of this valley on the north and east reach an elevation of eleven thousand five hundred feet, and as the conglomerates may be seen reaching and forming the loftiest summits without perceptible break or change of character, it is probable that they will be found to enclose the remains of forests throughout.

"On some of the higher summits to the east of Yellowstone Lake similar stratified conglomerates contain silicified wood in a very fragmentary state. These conglomerates are composed mainly of basaltic and trachytic materials, but contain large quantities of fragments of sandstones and quartzites, which leads to the conclusion that portions of the earlier Tertiary strata have been broken up and ejected with the igneous products. It is quite probable that these strata were among the later products of the volcanic Tertiary age proper. They are generally found abutting against masses of unstratified igneous materials that probably mark the sites of islands which were doubtless volcanic centres. I find that as we recede from these centres of eruption the strata diminish very perceptibly in thickness and coarseness of materials, and have at the same time a very perceptible dip toward the surrounding valleys. One is at times led to suspect that portions at least of these beds are of subaërial formation, as is the case with extensive strata about the cones of modern volcanoes, but there are a multitude of facts that go to prove that the greater part of the formations of this age were rearranged or sedimented in water."

The plains along the lower Yellowstone are in many localities so thickly covered with silicified trees that they have received the name of "petrified forests." The strong resemblance of these stony trees to the dry fallen trunks of modern timber is most remarkable. The woody fibre and the layers of growth are as perfect and natural as in our living trees. Yet they all belong to a past age, the Tertiary, and the species or varieties are extinct, yet undoubtedly are the true ancestors of our living vegetation. (We may refer to this subject again in connection with remarks on the ancient vegetation of the West.)

YELLOWSTONE NATIONAL PARK.

In this connection we may describe briefly some of the wonders of the Yellowstone National Park and its surroundings. Within the last decade the remarkable scenery of the Rocky Mountain region has become more and more familiar to the travelling public, and as the facilities for reaching every portion of our great West are increasing every year, those portions which have hitherto been considered accessible only to the adventurous explorer or pioneer will soon be easily reached by the general public. Already a railroad from Cheyenne, Wyoming Territory, to the Yellowstone Park has been commenced, and 125 miles of it are to be completed during the year 1880. The far-famed Yosemite Valley, the Snowy Sierras, the deep gorges of the Colorado of the West, the great area of lofty mountain-peaks in Central Colorado—not surpassed by the world-renowned scenery of the Alpine districts of Europe—are now reached with comparatively little difficulty by the travelling public. Indeed, it may now be said that the era of exploration is past for the United States and Territories, for there are now no tracts of any size that have not been examined with more or less care, and the novelty taken from them.

Located in the north-western corner of Wyoming Territory, about the head-waters of the Missouri and Yellowstone Rivers, is a tract of country more remarkable for the wonderful phenomena of Nature than any other region of the globe. It may very properly be called the "Northern Wonderland," in contradistinction to a similar region in New Zealand which is now known as the "Southern Wonderland." It is a singular fact that this marvellous region has been known to the world with any certainty only for a period of about ten years. Vague rumors of burning plains, boiling springs, volcanoes ejecting water and mud, great lakes, and other wonders, had indeed reached the civilized world from time to time, but as the most astounding stories of petrified forests, of animals turned to stone, and of streams flowing so rapidly that their waters became heated were intermingled with these rumors, the latter were disregarded altogether, and were looked upon as the wild vagaries of wandering mountaineers.

Captains Lewis and Clarke, in their exploration of the head-waters of the Missouri in 1805, seem to have heard nothing of the marvels at the sources of the Madison and Yellowstone Rivers. The Yellowstone Lake was placed by them on the map as a large body of water, but they had no personal knowledge yet, their information having been, in all probability, derived from the Indians. The first trustworthy accounts that made any impression on the public were given by a small party under General Washburne, the surveyor-general of Montana, and escorted by a small body of United States soldiers under Lieutenant G. C. Doane, in 1870. This party spent about a month in these interesting localities. Hon. N. P. Longford the same year gave a popular account of these phenomena in *Scribner's Monthly*, which excited great interest. Many other expeditions, official and unofficial, too numerous to mention in this connection, have since visited this region. During the seasons of 1871 and 1872 the writer conducted a thoroughly-organized corps in this district, and made a systematic survey of it. The official report of the expedition of 1871, published by the government, created so great an interest among the people that, through the efforts of the writer, in February, 1872, Congress was induced to pass an act withdrawing from settlement, occupancy, or sale under the laws of the United States an area about the sources of the Yellowstone River embracing about thirty-five hundred square miles, dedicating and setting it apart as a public park or pleasure-ground for the benefit and enjoyment of the people.

Up to the time of these explorations the great Divide or watershed of the continent was probably the least-known region in America, although it exceeds all other regions in geographical as well as geological interest. So much information of a strictly scientific character was obtained at that time, so many new streams and lakes were surveyed and properly located, that our knowledge of this wonderful land may be said to have been placed upon a reliable basis.

From a purely geographical point of view, the Yellowstone National Park may be said to embrace some of the most remarkable and instructive features in North America. It forms the very apex or divide of the continent. Within a radius of twenty-five miles may be found the sources of three of the largest rivers in America. The general elevation is from six to eight thousand feet above sea-level, while the mountains, the eternal snows of which form the sources of the great rivers just mentioned, rise to the height of from ten to twelve thousand feet. Flowing northward are the numerous branches of the Missouri, Yellowstone, and Wind Rivers, all of which eventually unite in one great stream, the Missouri; to the south are the branches of Green River, which latter unites with the Colorado and finally empties into the Gulf of California; while south and west flow the branches of Snake River, which, joining the Columbia, pour their vast volume of water into the Pacific.

The Yellowstone Lake, which is one of the most beautiful bodies of water on the continent, is always of a deep emerald-green color, and is set like a gem amid the surrounding volcanic mountain-peaks. On the south side of the lake, not more than half a mile distant from it, and not over three hundred feet above the level of its surface, is the Divide between the drainage of the Atlantic and Pacific slopes. It would require but little labor to turn the waters of the lake into Snake River. Here is located the celebrated Two-Ocean Pass, where at certain seasons of the year the waters of the same channel separate, a portion flowing in either direction. From the summits of the snow-capped peaks surrounding the lake the view is grand beyond description. From the top of Red Mountain, on the south side, the scope of vision embraces a circle having a radius of one hundred and fifty miles, within which four hundred and seventy mountain-peaks worthy of a name can be distinctly seen. The area swept by the eye from this point cannot be much less than from thirty to fifty thousand square miles, embracing portions of Wyoming, Montana, Idaho, and Utah, and exhibiting every variety of the grandest and most beautiful scenery. Ten large lakes and several smaller ones are taken in by this view, and the entire Yellowstone Park is spread out under the eye. The purity of the atmosphere in these high latitudes is well known, so that these statements will not seem exaggerated. On the east side of the Yellowstone River, between the first and second cañons, we find one of the most symmetrical and remarkable ranges of mountains to be seen in the West. This range was called the Yellowstone, and has been pronounced by Alpine travellers to be equal in beauty and artistic form to any in Central Europe. Sharp, jagged peaks and pyramidal masses stand out boldly against the sky, their snow-crowned heads glittering in the sunlight. The central portion of this range is composed of granite rocks, through the fissures of which the igneous matter has risen to the surface, covering the sides and summits and giving to the entire mass a peculiarly sombre hue. At the west base of this range is one of the remarkable lake-basins for which the West has now become famous. This basin has a length of thirty miles and an average width of five miles. It is supposed that during the Pliocene Tertiary period there was a series of these peculiar lake-basins all along the upper portions of the great rivers of the West, in the sediments of which were entombed the remains of many extinct animals, such as the mastodon, elephant, rhinoceros, camel, horse, etc., which thousands of years ago roamed over this broad region unmolested by man.

To the geologist the Yellowstone Park offers an endless field for observation and speculation. As we have previously remarked, this entire area was, in comparatively modern geological times, the scene of the most wonderful volcanic activity known in any portion of our country. From innumerable craters or vast fissures in the earth's crust were ejected in Pliocene or Post-Pliocene times vast quantities of fragments of rocks, ashes, tuffs, etc. into the surrounding waters, where they were rearranged in horizontal beds from three to five thousand feet in thickness. It was from these beds that the strange, marvellous forms which meet the eye at every point have been carved out by the erosive action of water. The Grand Cañon of the Yellowstone River, the towers of Tower Falls, and the deep gorges of the branches of the East Fork are marked illustrations of this strange scenery. These walls are surmounted by a great variety of architectural forms, among which it does not require a vivid imagination to trace huge castles and fortress-walls. The prevailing hue is a sombre black, although in many localities almost every shade of color is represented. Perhaps the most prominent feature of the park, in which it differs from the Yosemite Valley and other remarkable localities, is the variety of its scenery. The traveller passes from one unique scene to another, so that his vision never wearies and is never satisfied.

THE HOT SPRINGS OF YELLOWSTONE NATIONAL PARK.

Among the remarkable natural phenomena of the Yellowstone National Park, none have attracted more attention from travellers and scientists than the thermal springs, which occur in great numbers. Almost every known variety of hot springs is found here, which are the result of volcanic action. The Geysers of Iceland, which have excited the wonder of scientific men for several centuries, the still more remarkable and numerous hot springs of New Zealand, the mud springs and mud geysers of Java, the sulphur and steam vents which occur in almost all volcanic regions, exist here in vast numbers. Indeed, they surpass in number and magnitude all the world besides. These hot springs, which are slowly dying out, represent the last of a series of remarkable physical events.

The hot springs of the park may be separated into two classes, based on the character of their deposits—namely, those in the deposits of which lime predominates, and those in which silica is most abundant. The remarkable group on Gardiner's River illustrates the first class, while the Upper and Lower Geyser Basins of the Firehole River are the most striking examples of the second class. The character of the deposit depends upon the nature of the underlying rocks through which the heated waters reach the surface. Beneath the calcareous deposit of the hot springs of Gardiner's River there are from fifteen hundred to two thousand feet of limestone strata. The heated waters on their way upward dissolve the lime, and the latter reaches the surface in solution, and is left by evaporation in the beautiful and unique forms which so much excite the admiration of the observer. The siliceous springs come to the surface through volcanic and other rocks in which silica is the principal constituent, and the silica is deposited about the orifice in the same way as the lime, but at a far less rapid rate. Here it is again the process of evaporation which forms the beautiful decorations about the springs. It is, however, to the wonderful variety, exquisitely delicate colors, and the almost unnatural transparency of the waters that these springs owe much of their attractiveness. The orifices through which the hot waters issue are beautifully enamelled with a porcelain-like lining, and around the edges a layer of sulphur is precipitated. Along the sides and bottoms of the numerous little channels of the streams that flow from these springs there is a striking display of the most vivid colors, consisting of various shades of red, from scarlet to a bright rose-tint, and yellow, from bright sulphur through all conceivable shades to light cream-color. There are also various shades of green, arising from the peculiar vegetable forms with which many of the springs are filled. Great quantities of a fibrous, silky substance, which occurs in the little streams that flow from the boiling springs, and vibrates with the smallest movement of the water, add still more to the beauty of the scene.

The remarkable transparency and deep, vivid blue color of the waters, as seen in many of the springs, are marvels which attract the eye of the traveller. The sky, with the smallest cloud that flits across its face, is reflected in the clear depth of these waters, and the ultramarine colors displayed by them, more vivid even than the deep blue of the sea, are greatly heightened by the constant gentle vibration. One can look down into the clear depths and see with perfect distinctness the minutest ornament on the inner sides of the basin.

These springs represent every stage of development, from the most active geysers of the first class in power and size to the entire extinction of all activity. In the Upper and Lower Geyser Basins of the Firehole River there are about fifty springs that might be regarded as geysers of the first class, throwing upward a column of water from a few feet to over two hundred feet in height. Then there is every grade downward to simple boiling, or even quiet, hot springs. All about are seen great numbers of dead springs which may once have been geysers of the first class. Among the hundreds of groups of springs that are distributed over the park the proofs of former intensity are everywhere to be found, showing that the springs still left are only remnants as compared with the number and power of those that must have existed at the cessation of the true volcanic forces.

Next to the geysers are the mud volcanoes, mud springs, fumaroles, or salses, as they are usually termed. They also vary in grade from a simple bowl of turbid water to a vast crater of seething mud fifty to one hundred feet in diameter. Many of these mud springs are of great beauty, the siliceous fine clay presenting every shade of yellow and pink, derived from the ferric oxides, and a fineness of composition that would equal the purest meerschaum.

There are also deep boiling caldrons from which are emitted clouds of sulphurous vapors and steam that settle down upon the surrounding vegetation, encrusting it with fine mud. Dr. Hochstetter, speaking of the same phenomena in the great Southern Wonderland of New Zealand, describes them as follows:

"The entrance to the ravine is overgrown with a thicket, and is rather difficult of access; it also requires considerable caution, as suspicious places have to be passed where the visitor is in danger of being swallowed up in the heated mud. Inside, the ravine has the appearance of a volcanic crater. The bare walls, utterly destitute of vegetation, are terribly fissured and torn, and odd-looking serratures, threatening every moment to break loose, loom up like dismal spectres of red, white, and blue fumarole clay, evidently the last remains of decomposed rocks. The bottom of the ravine is simmering. There lies a deep basin of boiling water; next to this is a terrible hole emitting hissing jets of steam; and farther on are mud-cones, from two to five feet high, vomiting hot mud from their craters with dull rumblings, and imitating on a small scale the play of large fire volcanoes."*

I will not dwell on the probable origin of these thermal springs, as they have been studied by some of the ablest men of science in Europe, as Bunsen, Bischoff, Tyndall, and others, and their conclusions have been accepted. It is supposed that they are all remnants of volcanic action, and, like volcanoes, derive their heat from some deep-seated portion of the earth's crust. Geysers may be regarded as volcanoes, except that the former throw out heated waters, while the latter eject melted materials, etc.

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* Hochstetter's *New Zealand*, p. 414.

LEGISLATION RESPECTING YELLOWSTONE NATIONAL PARK.

As has been previously stated, during the session of 1871–72 both Houses of Congress passed a bill to set apart an area about the sources of the Yellowstone River embracing these wonderful curiosities as a public park for the benefit and instruction of the people. At the request of the committee to whom the bill was referred, the writer prepared the following report, and on the strength of the information contained therein the bill became a law:

"The Committee on the Public Lands, having under consideration bill H. R. 764, would report as follows:

"The bill now before Congress has for its object the withdrawal from settlement, occupancy, or sale under the laws of the United States a tract of land fifty-five miles wide by sixty-five long about the sources of the Yellowstone and Missouri Rivers, and dedicates and sets it apart as a great national park or pleasure-ground for the benefit and enjoyment of the people. The entire area comprised within the limits of the reservation contemplated in this bill is not susceptible of cultivation with any degree of certainty, and the winters would be too severe for stock-raising. Whenever the altitude of the mountain-districts exceeds six thousand feet above tide-water, their settlement becomes problematical, unless there are valuable mines to attract the people. The entire area within the limits of the proposed reservation is over six thousand feet in altitude, and the Yellowstone Lake, which occupies an area fifteen by twenty-two miles, or three hundred and thirty square miles, is 7788 feet. The ranges of mountains that hem the valleys in on every side rise to the height of ten to twelve thousand feet, and are covered with snow all the year. These mountains are all of volcanic origin, and it is not probable that any mines or minerals of value will ever be found there. During the months of June, July, and August the climate is pure and most invigorating, with scarcely any rain or storms of any kind, but the thermometer frequently sinks as low as 26°. There is frost every month in the year. This whole region was in comparatively modern geological times the scene of the most wonderful volcanic activity of any portion of our country. The hot springs and geysers represent the last stages—the vents or escape-pipes—of these remarkable volcanic manifestations of the internal forces. All these springs are adorned with decorations more beautiful than human art ever conceived, and which have required thousands of years for the cunning hand of Nature to form. Persons are now waiting for the spring to open to enter in and take possession of these remarkable curiosities, to make merchandise of these beautiful specimens, to fence in these rare wonders so as to charge visitors a fee, as is now done at Niagara Falls, for the sight of that which ought to be as free as the air or water.

"In a few years this region will be a place of resort for all classes of people from all portions of the world. The Geysers of Iceland, which have been objects of interest for the scientific men and travellers of the entire world, sink into insignificance in comparison with the hot springs of the Yellowstone and Firehole Basins. As a place of resort for invalids it will not be excelled by any portion of the world. If this bill fails to become a law this session, the vandals who are now waiting to enter into this wonderland will in a single season despoil beyond recovery these remarkable curiosities, which have required all the cunning skill of Nature thousands of years to prepare.

"We have already shown that no portion of this tract can ever be made available for agricultural or mining purposes. Even if the altitude and the climate would permit the country to be made available, not over fifty square miles of the entire area could ever be settled. The valleys are all narrow, hemmed in by high volcanic mountains like gigantic walls.

"The withdrawal of this tract, therefore, from sale or settlement takes nothing from the value of the public domain, and is no pecuniary loss to the government, but will be regarded by the entire civilized world as a step of progress and an honor to Congress and the nation.

"DEPARTMENT OF THE INTERIOR,
WASHINGTON, D. C., January 29, 1872.

"SIR: I have the honor to acknowledge the receipt of your communication of the 27th inst., relative to the bill now pending in the House of Representatives dedicating that tract of country known as the Yellowstone Valley as a national park.

"I hand you herewith the report of Dr. F. V. Hayden, United States Geologist, relative to said proposed reservation, and have only to add that I fully concur in his recommendations, and trust that the bill referred to may speedily become a law. Very respectfully, your obedient servant,

"C. DELANO, *Secretary.*

"Hon. M. H. DUNNELL, House of Representatives.

"The committee therefore recommend the passage of the bill without amendment."

The text of the bill is as follows:

"*An act to set apart a certain tract of land lying near the head-waters of the Yellowstone River as a Public Park. Be it enacted by the Senate and House of Representatives of the United States of America, in Congress assembled,* That the tract of land in the Territories of Montana and Wyoming lying near the head-waters of the Yellowstone River, and described as follows—to wit: commencing at the junction of Gardiner's River with the Yellowstone River, and running east to the meridian passing ten miles to the eastward of the most eastern point of Yellowstone Lake; thence south along said meridian to the parallel of latitude passing two miles south of the most southern point of Yellowstone Lake; thence west along said parallel to the meridian passing fifteen miles west of the most western point of Madison Lake; thence north along said meridian to the latitude of the junction of the Yellowstone and Gardiner's Rivers; thence east to the place of beginning,—is hereby reserved and withdrawn from settlement, occupancy, or sale under the laws of the United States, and dedicated and set apart as a public park or pleasuring-ground for the benefit and enjoyment of the people; and all persons who shall locate or settle upon or occupy the same or any part thereof, except as hereinafter provided, shall be considered trespassers and removed therefrom.

"SEC. 2. That said public park shall be under the exclusive control of the Secretary of the Interior, whose duty it shall be, as soon as practicable, to make and publish such rules and regulations as he may deem necessary or proper for the care and management of the same. Such regulations shall provide for the preservation from injury or spoliation of all timber, mineral deposits, natural curiosities, or wonders within said park, and their retention in their natural condition. The Secretary may, in his discretion, grant leases for building purposes, for terms not exceeding ten years, of small parcels of ground, at such places in said park as shall require the erection of buildings for the accommodation of visitors; all of the proceeds of said leases and all other revenues that may be derived from any source connected with said park to be expended under his direction in the management of the same and the construction of roads and bridle-paths therein. He shall provide against the wanton destruction of the fish and game found within said park, and against their capture or destruction for the purpose of merchandise or profit. He shall also cause all persons trespassing upon the same after the passage of this act to be removed therefrom, and generally shall be authorised to take all such measures as shall be necessary or proper to fully carry out the objects and purposes of this act." Approved March 1, 1872.

PRINCIPAL RIVERS OF THE NORTH-WEST.

In this connection it is thought best to present a brief account of the principal rivers that drain the vast area of the North-west.

The Missouri River and its tributaries form one of the largest as well as most important hydrographical basins in America. They drain an area of nearly or quite one million square miles. Rising in the loftiest portion of the Rocky Mountains, the Missouri flows northward in three principal branches—Madison, Gallatin, and Jefferson Forks—to their junction, and then proceeds onward until it emerges from the Gate of the Mountains, nearly two hundred miles; it then bends to the eastward, flowing in this direction to the entrance of White Earth River, a distance of nearly five hundred miles; it then gradually bends southward to its junction with the Mississippi, a distance of fifteen hundred to two thousand miles. The branches which form the sources of the Missouri rise in and near the Yellowstone National Park, flowing for the most part through metamorphic and volcanic rocks, until the main river emerges from the mountains into the plains, where it passes over Jura-Trias beds. The Falls of the Missouri, which extend for a distance of twenty or thirty miles, cut their way through a great thickness of these Jura-Trias rocks. Below the falls the channel passes through the soft yielding clays and sands of the Cretaceous beds for two hundred and fifty miles, with the exception of the Judith Tertiary Basin, which is about forty miles in length. The Cretaceous beds then reappear, extending nearly to the mouth of Milk River, where the Lignitic beds commence. These are also composed of sands, marls, and clays, with intercalated beds of brown coal of greater or less economic value. The river flows through these Lignitic beds to the mouth of Heart River, below Fort Union, a distance of nearly two hundred and fifty miles, where the Cretaceous rocks rise to the surface again. These latter formations extend to within a short distance of Council Bluffs, more than five hundred miles. (I have estimated the distance in a straight line as nearly as possible.) Just above Council Bluffs the Coal-measure limestones commence, and the valley of the Missouri gradually becomes more restricted, though it is still of moderate width below the mouth of the Kansas.

The Yellowstone River is by far the largest branch of the Missouri, and for four hundred miles, from its mouth up, it seems to be as large as the Missouri itself from Fort Reno to Fort Union. It is navigable for steamers during the spring and early summer for three or four hundred miles above its junction with the Missouri. This river takes its rise in the main Divide of the Rocky Mountains, properly in the beautiful and now well-known Yellowstone Lake. Its channel is worn through rocks very similar to those of the Missouri and its branches, the lower four hundred miles of its course being through the Lignitic beds for the most part. The character of its valley is very similar to that of the Missouri. It is now settled up by farmers almost continuously from the lower cañon to its junction with the Missouri.

Tongue and Powder Rivers, which are quite long branches, have their origin in the Big Horn Mountains, their channels cutting through the rocks that surround the Big Horn range. Tongue River is nearly one hundred and fifty miles in length, and flows for the most part through soft, yielding rocks of the Lignitic group. Powder River is from two hundred and fifty to three hundred miles in length, and also flows nearly all its course through the same Lignitic beds.

Below the mouth of the Yellowstone River we observe on the right side of the Missouri River several large branches, as Little Missouri, Big Knife, Heart, Cannon Ball, Grand, Moreau, and Big Cheyenne. These streams are confined mostly to the plains, and often cease to be running streams in the dry season, except about their sources.

The Teton River takes its origin in the north-western rim of the White River Tertiary Lake-Basin, and runs nearly east, for the most part through formations of Upper Cretaceous age. It drains an area about one hundred miles in length and thirty to fifty in breadth.

The next most prominent stream is White River, which flows directly through the Bad Lands, and gives the name to one of the most remarkable Tertiary deposits in the world. (This interesting lake-basin will be referred to again farther on.) The river takes its rise in the plains near latitude 42½° and longitude 104°, flows for a time in a north-east direction, then bends so as to enter the Missouri a little south of east near latitude 43° 41′ and longitude 99½°. Nearly its entire course lies through the White River Tertiary beds, and for the greater part of the year its waters are so full of sediment as to be unfit for use. When the water stands for a time a thick scum accumulates on the surface, which has much the color and consistency of cream. The water itself looks very much like turbid lime-water, and is very astringent to the taste. The valley is generally open, tolerably well wooded, abounding in fine grass, and has always been a favorite resort for the Indians. The road between Fort Reno on the Missouri River and Fort Laramie passes up the valley for a considerable distance through some of the most picturesque scenery in the West. The river has numerous branches, but the only one of importance is called the South Fork, and is nearly as large and as long as the main stream. It drains an area about two hundred and fifty miles in length and forty to sixty in breadth.

The Niobrara is the next most important stream, and is about four hundred and fifty miles in length. This also flows for the most part through the sands and clays of the Great Lake-Basin, of which the well-known "Bad Lands" form a conspicuous part. It is a beautiful stream of rather swift running water, generally ten to fifteen feet in width, but widening as it descends. There is much fertile land in this valley, possessing many attractions for the settler. It has always been a favorite camping-place for the various bands of Indians that roam over this region.

The great sub-hydrographical basin, and perhaps in many respects the most important one in the Missouri Valley, is that of the Platte, which empties into the Missouri River near latitude 41° 3′ 24″. Its valley forms a natural grade for a railroad to the foot of the mountains, and already one has been constructed from Omaha City across the continent. The Platte River takes its rise in the Laramie range, and flows for the greater part of its course through the more recent beds of the Tertiary deposits. The area drained by this river must be at least six hundred miles from west to east, and eighty to one hundred and fifty from north to south. Although this stream is one thousand yards or more in width, the water is so shallow and the channel so shifting that it can never be rendered navigable, even for small boats. In early days the fur-traders were never able to rely on it for the transportation of their peltries, furs, and skins.

On the left or north side of the Missouri River there are comparatively few branches; the principal of them are Milk, White Earth, James, Vermilion, and Big Sioux. The three last named rise in the far north and flow through a much more rocky region and over a stonier bed, and their waters, as they pour into the Missouri, contain less sediment than any of the others. Indeed, most of the rivers previously described flow through a generally barren country, with a thirsty atmosphere and a still more thirsty soil, and on their way to the Missouri Valley they lose nearly or quite all their waters. Many of these long rivers, as Grand, Cannon Ball, and Cheyenne, in the autumn frequently have so little water as to cease to be running streams, while perhaps one hundred miles above their mouths, if in the vicinity of some mountain, there is a full supply of water. The Musselshell River is a fine example: toward its source it is a fine running stream; in the dry season it is lost almost entirely before reaching the Missouri. Much more might be said in this connection, but enough has been given to enable the reader to comprehend to some extent the geographical area drained by the Missouri River and its tributaries.

THE TERTIARY LAKE-BASINS OF THE WEST.

We have frequently spoken in reference to the wonderful Tertiary lake-basins of the West. These were first made known on the eastern slope of the Rocky Mountains, and among the most wonderful is that of the Mauvaises Terres, or "Bad Lands," of Dakota. These lake-basins are found all over the West, from the Missouri River to the Pacific coast, and belong in age to various divisions of the Tertiary epoch. There is no water in them at this time, and their existence is only known to the student of geology.

During the Tertiary period the Bad Lands Basin occupied an area of at least one hundred thousand, and very possibly one hundred and fifty thousand, square miles. It will thus be seen that our greatest northern lakes, of which we so proudly boast, are but ponds in comparison with some that once existed in this mountain-region. The close observer will notice at once that he is passing into a district, the rock-formations of which are quite different from any that he has seen before. He finds also that he is passing beyond the region of great fertility, luxuriant vegetation, fine farms, and fields of grain to a comparatively arid, sterile region; still, the broad bottoms of the Platte are covered with a fair growth of grass, but the chances for the successful cultivation of crops of any of the cereals are very small. The soil becomes too thin, sandy, and arid for the growth of anything more than a scanty vegetation.

We might linger here for a moment and inquire into some of the causes that have produced this scantiness of vegetation and almost entire absence of trees over so large an area. There is quite a remarkable belt or zone of country along the eastern base of the Rocky Mountains, extending from the Arctic Sea far south to Mexico, upon which but a small amount of moisture ever falls. This has often been denominated the Great American Desert. In years past this belt was supposed to comprise the greater portion of the area lying between the Missouri River and the foot of the mountains, but every year, as we know more and more of the country, this belt becomes narrower and narrower, and as a continuous area it has already ceased to exist, even in imagination. There are, however, large portions of the country that are comparatively worthless and arid, which may be called barren or sterile. It is now pretty well understood that the cause of the absence of timber in this great region is want of moisture. A very clear explanation of this subject, and one which seems in accordance with the facts, is given by Professor Dana in *Silliman's Journal* (vol. xl., page 393). If we were to examine a rain-chart, we should find that where the forests are most luxuriant, as along the Atlantic coast in the southern portion of the Mississippi Valley, the greatest amount of rain falls annually—say fifty to sixty-five inches; and as soon as we approach any of the interior basins of the Western continent, or any portion of this dry belt, we observe that the amount of moisture diminishes to thirty, twenty, fifteen, ten, and in some cases to as low as five inches, annually. Again, along the Missouri River, where the vegetation is quite extensive and the forest trees abundant, we have twenty to thirty inches of rain, but as soon as we pass to the westward three hundred miles we have but ten or fifteen inches. On the Pacific coast of Oregon and Washington, whose gigantic forests are celebrated all over the world, we find that from fifty-five to sixty-five inches of rain fall annually. We might multiply these illustrations, but the evidence seems to be conclusive.

There is another point that may be worthy of note here, and that is the prevailing impression among all the inhabitants of the West of a gradual change of climate by settlement and the cultivation of the soil. It is a fact that over a width of one hundred miles or more along the Missouri River the little groves of timber are extending their area, that springs of water are continually issuing from the ground where none were ever known before, and that the distribution of rain throughout the year is more equable. Such being the case, time may work important changes, and settlements may at some period cause a large portion of that belt which has hitherto been regarded as given up to sterility to become of value for the abode of man.

The valleys of the Loup Fork and the Niobrara Rivers, although largely uninhabitable, are full of interest to the geologist. Located along these rivers is one of those grand cemeteries of extinct animals which have excited the wonder of intelligent men all over the world. Farther to the north-west, on White Earth River, is another of these far-famed bone-deposits. These two interesting localities bear such a relation to each other in the order of time and the relationship of the animals preserved in them that they should be described in the same connection. I will therefore take the reader at once to the valley of White Earth River, near the south-western base of the Black Hills, and there we shall behold one of the wildest regions on this continent. It has always gone by the name of "Bad Lands;" by the Canadian French known as *Mauvaises Terres;* in the Dakota tongue, *Ma-koó-si-tcha.* These words signify a very difficult country to travel through, not only from the ruggedness of the surface, but also from the absence of any good water and the small supply of wood and game. In the summer the sun pours its rays on the bare white walls, which are reflected on the weary traveller with double intensity, not only oppressing him with the heat, but so dazzling his eyes that he is not unfrequently affected with temporary blindness. I have spent many days exploring this region when the thermometer was 112° in the shade and there was no water suitable for drinking purposes within fifteen miles. But it is only to the geologist that this place can have any permanent attractions. He can wind his way through the wonderful cañons among some of the grandest ruins in the world. Indeed, it resembles a gigantic city fallen to decay. Domes, towers, minarets, and spires may be seen on every side, which assume a great variety of shapes when viewed in the distance. Not unfrequently, the rising or the setting sun will light up these grand old ruins with a wild, strange beauty, reminding one of a city illuminated in the night when seen from some high point. The harder layers project from the sides of the valley or cañon with such regularity that they appear like seats, one above the other, of some vast amphitheatre.

THE FOSSIL TREASURES OF THE LAKE-BASINS.

It is at the foot of these apparent architectural ruins that the curious fossil treasures are found. In the oldest beds we find the teeth and jaws of a hyopotamus, a river-horse much like the hippopotamus, who must have sported in his pride in the marshes that bordered this lake. So, too, the titanotherium, a gigantic pachyderm, was associated with a species of hornless rhinoceros. These huge rhinoceroid animals appear at first to have monopolized this entire region, and the plastic, sticky clay of the lowest bed of this basin, in which the remains were found, seems to have formed a suitable bottom to the lake in which these thick-skinned monsters could wallow at pleasure. As we pass higher up in the sediments, we find the remains of a great variety of land animals mingled with those that were aquatic in their nature. In a bed of flesh-colored marl which is visible for a great distance, like a broad band in the sides of these washed hills, thousands of turtles were imbedded, and are preserved to the present time with surprising perfection, the hard portions of them being as complete as when they were swimming about in these Tertiary waters hundreds of thousands of years ago. They vary in size from an inch or two across the back to three or four feet. But one species has ever been discovered in this basin, and so far as we know these reptiles made up in numbers what they lacked in variety. Associated with the remains of the turtles are those of a number of ruminants, all belonging to extinct genera, and possessing peculiar characters which ally them to the deer and the hog. Indeed, Dr. Leidy calls them ruminating hogs. Like the domestic species, they were provided with cutting teeth and canines, but the grinding teeth are constructed after the same pattern as those of all living ruminants. The feet of these animals were also provided with four toes as in the hog, and none of them possessed horns or antlers. They appear to have existed in immense numbers, and to have lived in great herds like the bisons of the West. Remains of more than seven hundred individuals of one species have been already studied and described by Dr. Leidy. Their enemies were numerous—wolves, hyænodons, and sabre-tooth tigers.

If we pass for a moment southward into the valleys of the Niobrara and Loup Fork, we shall find a fauna closely allied, yet entirely distinct from the one on White River, and plainly intermediate between that of the latter and of the present period; one appears to have lived during the Middle or Miocene Tertiary period, and the other at a later time, in what is called the Pliocene. In the later fauna were the remains of a number of species of extinct camels, one of which was of the size of the Arabian camel, a second about two-thirds as large; also a smaller one. The only animals akin to the camels at the present time in the Western hemisphere are the llama and its allies in South America. Not less interesting are the remains of a great variety of forms of the horse family, one of which was about as large as the ordinary domestic animal, and the smallest not more than two or two and a half feet in height, with every intermediate grade in size. There was still another animal allied to the horse, about the size of a Newfoundland dog, which was provided with three hoofs to each foot, though the lateral hoofs were rudimental. Although no horses were known to exist on this continent prior to its discovery by Europeans, yet Dr. Leidy has shown that before the age of man this was emphatically the country of horses. Dr. Leidy has reported twenty-seven species of the horse family which are known to have lived on this continent prior to the advent of man—about three times as many as are now found living throughout the world.

Among the carnivores were several foxes and wolves, one of which was larger than any now living; three species of hyænodon—animals whose teeth indicate that they were of remarkably rapacious habits; also five animals of the cat tribe were found, one about the size of a small panther and another as large as the largest wolf. Several of the skulls of the tiger-like animals exhibited the marks of terrible conflicts with the contemporary hyænodons.

Among the rodents were a porcupine, small beaver, rabbit, mouse, etc.

The pachyderms, or thick-skinned animals, were quite numerous and of great interest, from the fact that none of them are living on this continent at the present time, and yet here we find the remains of several animals allied to the domestic hog—one about the size of this animal, another as large as the African hippopotamus, and a third not much larger than the domestic cat.

Five species of the rhinoceros roamed through these marshes, ranging from a small, hornless species, about the size of our black bear, to the largest, which was about the size of the existing unicorn of India. No animals of the kind now inhabit the Western hemisphere.

Among the thick-skinned animals were the remains of a mastodon and a large elephant, distinct from any others heretofore discovered in any part of the world. Dr. Leidy says that "it is remarkable that among the remains of mammals and turtles there are none of crocodiles. Where were these creatures when the shores of the ancient Dakotan and Nebraskan waters teemed with such an abundant provision of savory ruminating hogs?" During the Tertiary period Nebraska and Dakota were the homes of a race of animals more closely allied to those inhabiting Asia and Africa now, and from their character we may suppose that during that period the climate was considerably warmer than it is at present. The inference is also drawn that our world, which is usually called the New, is in reality the Old World, older than the Eastern hemisphere.

THE PRE-HISTORIC GEOGRAPHY OF THE LAKE-BASINS.

Ever since the commencement of creation constant changes of form have been going on in our earth. Oceans and mountains have disappeared, and others have taken their place. Entire groups of animal and vegetable life have passed away, and new forms have come into existence through a series of years which no finite mind can number. To enable the mind to realize the physical condition of our planet during all these past ages is the highest end to be attained by the study of geological facts. It has been well said by an eloquent historian that he who calls the past back again into being enjoys a bliss like that of creating.

We may attempt to form some idea of the physical geography of this region at the time when these animals wandered over the country, and to speculate as to the manner in which their remains have been so beautifully preserved for our examination. We may suppose that here was a large fresh-water lake during the Middle Tertiary period; that it began near the south-eastern side of the Black Hills, not large at first, nor deep, but as a marsh or mud-wallow for the gigantic pachyderms that lived at the time—that as time passed on it became deeper and expanded its limits until it covered the vast area which its sediments indicate. We cannot attempt to point out in detail all the changes through which we may suppose, from the facts given us, this lake has passed during the thousands of years that elapsed from its beginning to its extinction—time long enough for two distinct faunæ to have commenced their existence and passed away in succession, not a single species passing from one into the other. Even that small fraction of geological time seems infinite to a finite mind. We believe that the great range of mountains that now lies to the west of this basin was not as lofty as now—that doubtless the treeless plains were covered with forests or grassy meadows upon which the vast herds of gregarious ruminants cropped their food. Into this great lake on every side poured many little streams from broad valleys, fine ranging-ground for the numerous varieties of creatures that existed at that time. Large numbers of fierce carnivorous beasts mingled with the multitudes of gregarious ruminants, constantly devouring them as food. As many of the bones, either through death by violence or natural causes, were left in the valleys, they would be swept down by the first high waters into the lake and enveloped in the sediments at the bottom. As the gregarious ruminants came down to the little streams or by the shores of the lake to quench their thirst, they would be pounced upon by the flesh-loving hyænodon, drepanodon, or dinictis. It was probably near this place also that these animals would meet in fierce conflicts, the evidences of which remain to the present time in the cavities which the skulls reveal; one of these, of a huge cat, shows on either side the holes through the bony covering which had partially healed before the animal perished, and the cavities seem to correspond in form and position with the teeth of the largest hyænodon.

The remains of those animals which, from their very nature, could not have existed in great numbers, are not abundant in the fossil state, while those of the ruminants occur in the greatest abundance and are widely diffused in the sediments, not only geographically, but vertically.

The chances for the preservation of the remains of a species seem to depend upon the number of individuals that existed. The remains of ruminants already obtained comprise at least nine-tenths of the entire collection, while of one species portions of at least seven hundred individuals have been discovered. We might take examples from the animals that exist in this region at the present time that would illustrate the point. The wolves watch the deer, antelope, and other feebler animals as they go down to the little streams for water, and all over the wide bottoms their skeletons are distributed in a more or less perfect condition. Whenever a bison becomes too feeble by disease or age to offer a successful resistance, the wolves soon despatch him and his bones are left bleaching on the ground. In most cases these animals when pursued betake themselves to the water, where they are not unfrequently drowned or despatched on a sand-bar or island. Annually, thousands of buffaloes, in attempting to cross the Missouri River and some of its large tributaries on the ice as it is breaking up in the spring, are drowned. For many days their bodies are seen floating down the river by Fort Union or Fort Clark, and, lodging on some of the islands or sand-bars, fill the air with the stench of their decay. In the spring of 1857 thousands of their bodies floated down the Kansas River past Fort Riley, and were carried into the Missouri River. These animals are often mired in the marshes or the muddy shores of lakes or streams in great numbers. We know what vast numbers of the mastodon have been preserved in the Big Bone Licks of Kentucky, and of the Irish elk in the bogs of Ireland. We might instance hundreds of examples to show how easily these animals, roaming and feeding along the numerous streams flowing into some great lake, could be transported in part or entire into the lake, and sinking to the bottom would be enveloped in the muddy sediments.

There is another interesting feature in regard to these remarkable fossils, and that is the beauty and perfection of their preservation; the bones are so clean and white and the teeth so perfect that, when exposed upon the surface, they present the appearance of having bleached only for a season. They could not have been transported from a great distance, neither could the waters have been swift and turbulent, for the bones seldom show any signs of having been water-worn, and the nice sharp points and angles are as perfect as in life. I have dwelt thus long on the details of this great lake-basin not only on account of the universal interest that invests it, and the wonderful treasures of the past which it has revealed to the world, but because its history is applicable in the main to the numbers of the other fresh-water lake-basins of the geological past which are distributed throughout the Rocky Mountain region.

Before leaving this subject there is another interesting topic of inquiry—why such a beautiful series of vertebrate remains should be so perfectly preserved in this lake-deposit, and yet the remains of other forms of animal and vegetable life be almost entirely absent. The sediments seem to be peculiarly adapted to the preservation of a full series of documents bearing upon the history of those times. And yet in the older beds, where the mammalian remains are most abundant, only one small species of snail, a land-shell, is found preserved. Where is the evidence of the swarms of fishes that must have filled the streams and lakes of that time? Of the vegetable life, if any existed, only now and then a fragment of silicified wood is found, and that, too, in the latest deposits. I am prepared to believe that the broad plains were, even at the time of the existence of these animals, as treeless as at present, yet I am quite unprepared to explain the almost entire absence of vegetable remains. We know that fresh-water shells, much like those existing in the little clear streams of the present time, as well as some remains of fishes, are found in some limestones on the summits of hills near Pinos Spring on the northern rim of the lake.

Another interesting question occurs to me in this connection: How was it that a complete fauna, comprising more than forty species of animals, was introduced upon the earth, lived through its legitimate period, entirely perished or was swept out of existence, and an entirely new fauna, comprising about the same number and variety, was again introduced in the same region? It too lived out its period of existence, which must have been hundreds of thousands of years, and yet every one of this group of animals disappeared from the globe, leaving nothing behind to tell the tale but fragments of their bony skeletons accidentally enveloped in the sediment at the bottom of an estuary or lake.

It will be seen at a glance that this is a fruitful topic for speculation, and I leave it with the reader. Some of the species of animals found in the latest deposits seem to have lived very nearly up to our present period. The horns of a deer and the bones of a sand-hill crane have such a modern aspect that the thought arises, Where was man when these animals were roaming over this region? Recent investigations show quite conclusively that man was an inhabitant of Europe contemporaneously with many of the extinct animals of the Quaternary period, but it is doubtful whether we have ever found any evidence that he lived at a very remote period on this continent. Indeed, so far as we know at present, the West is singularly silent as to the existence of man in what are now understood as pre-historic times.

NORTH AMERICA IN THE TERTIARY AGE.

The following picture of North America during the Tertiary age is drawn by Professor Newberry in Hayden's *Annual Report* for 1870:

"Then a warm and genial climate prevailed from the Gulf to the Arctic Sea; the Canadian highlands were higher, but the Rocky Mountains lower and less broad. Most of the continent exhibited an undulating surface—rounded hills and broad valleys covered with forests grander than any of the present day, or wide expanses of rich savannah, over which roamed countless herds of animals, many of gigantic size, of which our present meagre fauna retains but a few dwarfed representatives. Noble rivers flowed through plains and valleys, and sea-like lakes, broader and more numerous than those the continent now bears, diversified the scenery. Through unnumbered ages the seasons ran their ceaseless course, the sun rose and set, moons waxed and waned over this fair land, but no human eye was there to mark its beauty nor human intellect to control and use its exuberant fertility. Flowers opened their many-colored petals on meadow and hillside, and filled the air with their perfumes, but only for the delectation of the wandering bee. Fruits ripened in the sun, but there was no hand there to pluck nor any speaking tongue to taste. Birds sang in the trees, but for no ears but their own. The surface of lake or river was whitened by no sail, nor furrowed by any prow but the breast of the water-fowl; and the far-reaching shores echoed no sound but the dash of the waves and the lowing of the herds that slaked their thirst in the crystal waters.

"Life and beauty were everywhere, and man, the great destroyer, had not yet come; but not all was peace and harmony in this Arcadia. The forces of Nature are always at war, and redundant life compels abundant death. The innumerable species of animals and plants had each its hereditary enemy, and the struggle of life was so sharp and bitter that in the lapse of ages many genera and species were blotted out for ever.

"The herds of herbivores—which included all the genera now living on the earth's surface, with many strange forms long since extinct—formed the prey of carnivores commensurate to these in power and numbers. The coo of the dove and the whistle of the quail were answered by the scream of the eagle, and the lowing of herds and the bleating of flocks come to the ear of the imagination mingled with the roar of the lion, the howl of the wolf, and the despairing cry of the victim. Yielding to the slow-acting but irresistible forces of Nature, each in succession of these various animal forms has disappeared, till all have passed away or been changed to their modern representatives, while the country they inhabited, by the upheaval of its mountains, the deepening of its valleys, the filling and draining of its great lakes, has become what it is."

ANCIENT LIFE IN THE FAR WEST DURING THE CRETACEOUS EPOCH.

In the following sketch the ancient life in the far West during the Cretaceous period has been most eloquently described by the eminent palæontologist, Prof. E. D. Cope, in the *Annual Report of the Geological Survey of the Territories* for 1871:

"That vast level tract of our territory lying between Missouri and the Rocky Mountains represents a condition of the earth's surface which has preceded, in most instances, the mountainous or hilly type so prevalent elsewhere, and may be called, in so far, incompletely developed. It does not present the variety of conditions, either of surface for the support of a very varied life or of opportunities for access to its interior treasures, so beneficial to a high civilization. It is, in fact, the old bed of seas and lakes, which has been so gradually elevated as to have suffered little disturbance. Consistently with its level surface, its soils have not been carried away by rain and flood, but rather cover it with a deep and widespread mantle. This is the great source of its wealth in Nature's creations of vegetable and animal life, and from it will be drawn the wealth of its future inhabitants. On this account its products have a character of uniformity; but viewed from the standpoint of the political philosopher, so long as peace and steam bind the natural sections of our country together, so long will the plains be one important element in a varied economy of continental extent. But they are not entirely uninterrupted. The natural drainage has worn channels, and the streams flow below the general level. The ancient sea- and lake-deposits have neither been pressed into very hard rock beneath piles of later sediment, nor have they been roasted and crystallized by internal heat. Although limestone rock, they easily yield to the action of water, and so the side-drainage into the creeks and rivers has removed their high banks from many rods to many miles from their original positions. In many cases these banks or bluffs have retained their original steepness, and have increased in elevation as the breaking down of the rock encroached on higher land. In other cases the rain-channels have cut in without removing the intervening rocks at once, and formed deep gorges or cañons, which sometimes extend to great distances. They frequently communicate in every direction, forming curious labyrinths, and when the intervening masses are cut away at various levels or left standing like monuments, we have the characteristic peculiarities of 'bad lands,' or *mauvaises terres*.

"In portions of Kansas tracts of this kind are scattered over the country along the margins of the river and creek valleys and ravines. The upper stratum of the rock is a yellow chalk, the lower bluish, and the brilliancy of the color increases the picturesque effect. From elevated points the plains appear to be dotted with ruined villages and towns, whose avenues are lined with painted walls of fortifications, churches, and towers, while side-alleys pass beneath natural bridges or expand into small pockets and caverns, smoothed by the action of the wind carrying hard mineral particles. But this is the least interesting of the peculiarities presented by these rocks. On the level surfaces, denuded of soil, lie huge oyster-like shells, some opened and others with both valves together, like remnants of a half-finished meal of some titanic race which had been frightened from the board never to return. These shells are not thickened like most of those of past periods, but contained an animal which would have served as a meal for a large party of men. One of them measured twenty-six inches across.

"If the explorer searches the bottoms of the rain-washes and ravines, he will doubtless come upon the fragment of a tooth or jaw, and will generally find a line of such pieces leading to an elevated position on the bank or bluff, where lies the skeleton of some monster of the ancient sea. He may find the vertebral column running far into the limestone that locks him in his last prison; or a paddle extended on the slope, as though entreating aid; or a pair of jaws lined with horrid teeth, which grin despair on enemies they are helpless to resist; or he may find a conic mound on whose apex glisten in the sun the bleached bones of one whose last office has been to preserve from destruction the friendly soil on which he reposed. Sometimes a pile of huge remains will be discovered, which the dissolution of the rock has deposited on the lower level, the force of rain and wash having been insufficient to carry them away.

"But the reader inquires, What is the nature of these creatures thus left stranded a thousand miles from either ocean? How came they in the limestones of Kansas, and were they denizens of land or sea? It may be replied that our knowledge of this chapter of ancient history is only about five years old, and has been brought to light by geological explorations set on foot by Dr. Turner, Professor Mudge, Professor Marsh,

W. E. Webb, and the writer. Careful examinations of the remains discovered show that they are nearly all to be referred to the reptiles and fishes. We find that they lived in the period called Cretaceous, at the time when the chalk of England and the green-sand marl of New Jersey were being deposited, and when many other huge reptiles and fishes peopled both sea and land in those quarters of the globe. The twenty-four species of reptiles found in Kansas up to the present time varied from ten to eighty feet in length, and represented six orders, the same that occur in the other regions mentioned. Two only of the number were terrestrial in their habits, and two were flyers; the remainder were inhabitants of the salt ocean. When they swam over what are now the plains, the coast-line extended from Arkansas to near Fort Riley on the Kansas River, and, passing a little eastward, traversed Minnesota to the British possessions, near the head of Lake Superior. The extent of sea to the westward was vast, and geology has not yet laid down its boundary; it was probably a shore now submerged beneath the waters of the North Pacific Ocean.

"Far out on this expanse might have been seen in those ancient days a huge, snake-like form which rose above the surface and stood erect, with tapering throat and arrow-shaped head, or swayed about, describing a circle of twenty feet radius above the water. Then it would dive into the depths, and naught would be visible but the foam caused by the disappearing mass of life. Should several have appeared together, we can easily imagine tall, twining forms rising to the height of the masts of a fishing-fleet, or like snakes twisting and knotting themselves together. This extraordinary neck—for such it was—rose from a body of elephantine proportions, and a tail of the serpent-pattern balanced it behind. The limbs were probably two pairs of paddles like those of *Plesiosaurus*, from which this diver chiefly differed in the arrangement of the bones of the breast. In the best-known species twenty-two feet represent the neck in a total length of fifty feet.

"This is the *Elasmosaurus platyurus* (Cope), a carnivorous sea-reptile, no doubt adapted for deeper waters than many of the others. Like the snake-bird of Florida, it probably often swam many feet below the surface, raising the head to the distant air for a breath, then withdrawing it and exploring the depths forty feet below, without altering the position of its body. From the localities in which the bones have been found in Kansas, it must have wandered far from land, and that many kinds of fishes formed its food is shown by the teeth and scales found in the position of its stomach.

"A second species of somewhat similar character and habits differed very much in some points of structure. The neck was drawn out to a wonderful degree of attenuation, while the tail was relatively very stout —more so, indeed, than in the *Elasmosaurus*—as though to balance the anterior regions while occupied in various actions; *e. g.*, while capturing its food. This was a powerful swimmer, its paddles measuring four feet in length, with an expanse therefore of about eleven feet. It is known as *Polycotylus latipinnis* (Cope).

"The two species just described formed a small representation in our great interior sea of an order which swarmed, at the same time or near it, over the gulfs and bays of old Europe. There they abounded twenty to one. Perhaps one reason for this was the almost entire absence of the real rulers of the waters of ancient America—viz. the *Pythonomorpha*. These sea-serpents—for such they were—embrace more than half the species found in the limestone rocks in Kansas, and abound in those of New Jersey and Alabama. Only four have been seen as yet in Europe.

"Researches into their structure have shown that they were of wonderful elongation of form, especially of tail; that their heads were large, flat, and conic, with eyes directed partly upward; that they were furnished with two pairs of paddles like the flippers of a whale, but with short or no portion representing the arm. With these flippers and the ell-like strokes of their flattened tail they swam, some with less, others with greater speed. They were furnished, like snakes, with four rows of formidable teeth on the roof of the mouth. Though these were not designed for mastication, and, without paws for grasping, could have been little used for cutting, as weapons for seizing their prey they were very formidable. And here we have to consider a peculiarity of these creatures in which they are unique among animals. Swallowing their prey entire like snakes, they were without that wonderful expansibility of throat due in the latter to an arrangement of levers supporting the lower jaw. Instead of this, each half of that jaw was articulated or jointed at a point nearly midway between the ear and the chin. This was of the ball-and-socket type, and enabled the jaw to make an angle outward, and so widen by much the space enclosed between it and its fellow. The arrangement may be easily imitated by directing the arms forward, with the elbows turned outward and the hands placed near together. The ends of these bones were in the *Pythonomorpha* as independent as in the serpents, being only bound by flexible ligaments. By turning the elbows outward and bending them, the space between the arms becomes diamond-shaped, and represents exactly the expansion seen in these reptiles to permit the passage of a large fish or other body. The arms, too, will represent the size of jaws attained by some of the smaller species. The outward movement of the basal half of the jaw necessarily twists in the same direction the column-like bone to which it is suspended. The peculiar shape of the joint by which the last bone is attached to the skull depends on the degree of twist to be permitted, and therefore to the degree of expansion of which the jaws were capable. As this differs much in the different species, they are readily distinguished by the column or 'quadrate' bone when found. There are some curious consequences of this structure, and they are here explained as an instance of the mode of reconstruction of extinct animals from slight materials. The habit of swallowing large bodies between the branches of the under jaw necessitates the prolongation forward of the mouth of the gullet; hence the throat in the *Pythonomorpha* must have been loose and almost as baggy as a pelican's. Next, the same habit must have compelled the forward position of the glottis or opening of the windpipe, which is always in front of the gullet. Hence these creatures must have uttered no other sound than a hiss, as do animals of the present day which have a similar structure; as, for instance, the snakes. Thirdly, the tongue must have been long and forked, and for this reason: its position was still anterior to the glottis, so that there was no space for it except it were enclosed in a sheath beneath the windpipe when at rest, or thrown out beyond the jaws when in motion. Such is the arrangement in the nearest living forms, and it is always in these cases cylindric and forked.

"The giants of the *Pythonomorpha* of Kansas have been called *Liodon proriger* (Cope) and *Liodon dyspelor* (Cope). The first must have been abundant, and its length could not have been far from fifty feet; certainly not less. Its physiognomy was rendered peculiar by a long projecting muzzle, reminding one of that of the blunt-nosed sturgeon of our coast; but the resemblance was destroyed by the correspondingly massive end of the branches of the lower jaw. Though clumsy in appearance, such an arrangement must have been effective as a ram, and dangerous to its enemies in case of collision. The writer once found the wreck of an individual of this species strewn around a sunny knoll beside a bluff, and his conic snout pointing to the heavens formed a fitting monument, as at once his favorite weapon and the mark distinguishing all his race.

"Very different was the *Liodon dyspelor*, a still larger animal than the last, with a formidable armature. It was, indeed, the longest of known reptiles, and probably equal to the great finner-whales of modern oceans.

The circumstances attending the discovery of one of these will always be a pleasant recollection to the writer. A part of the face, with teeth, was observed projecting from the side of a bluff by a companion in exploration, Lieutenant James H. Whitten, United States army, and we at once proceeded to follow up the indication with knives and picks. Soon the lower jaws were uncovered, with their glistening teeth, and then the vertebræ and ribs. Our delight was at its height when the bones of the pelvis and part of the hind limb were laid bare, for they had never been seen before in the species and scarcely in the order. While lying on the bottom of the Cretaceous sea the carcass had been dragged hither and thither by the sharks and other rapacious animals, and the parts of the skeleton were displaced and gathered into a small area. The massive tail stretched away into the bluff, and after much laborious excavation we left a portion of it to more persevering explorers.

"The species of *Clidastes* did not reach such a size as some of the *Liodons*, and were of elegant and flexible build. To prevent their habits of coiling from dislocating the vertebral column, these had an additional pair of articulations at each end, while their muscular strength is attested by the elegant striæ and other sculptures which appear on all their bones. Five species of this genus occur in the Kansas strata, the largest (*Clidastes cineriarum*, Cope) reaching forty feet in length. The discovery of a related species (*Holcodus coryphæus*, Cope) was made by the writer under circumstances of difficulty peculiar to the plains. After examining the bluffs for half a day without result, a few bone fragments were found in a wash above their base. Others led the way to a ledge forty or fifty feet from both summit and foot, where, stretched along in the yellow chalk, lay the projecting portions of the whole monster. A considerable number of vertebræ were found preserved by the protective embrace of the roots of a small bush, and when they were secured the pick and knife were brought into requisition to remove the remainder. About this time one of the gales so common in that region sprang up, and, striking the bluff fairly, reflected itself upward. So soon as the pick pulverized the rock, the limestone dust was carried into eyes, nose, and every available opening in the clothing. I was speedily blinded, and my aid disappeared in the cañon, and was seen no more while the work lasted. Only the enthusiasm of the student could have endured the discomfort, but to him it appeared a most unnecessary 'conversion of force' that a geologist should be driven from the field by his own dust. A handkerchief tied over the face, and pierced by minute holes opposite the eyes, kept me from total blindness, though dirt in abundance penetrated the mask. But a fine relic of creative genius was extricated from its ancient bed, and one that leads its genus in size and explains its structure.

"On another occasion, riding along a spur of yellow-chalk bluff, some vertebræ lying at its foot met my eye. An examination showed that the series entered the rock, and, on passing round to the opposite side, the jaws and muzzle were seen projecting from it, as though laid bare for the convenience of the geologist. The spur was small and of soft material, and we speedily removed it in blocks to the level of the reptile, and took out the remains as they lay across the base from side to side.

"A genus related to the last is *Edestosaurus*. A species of thirty feet in length, and of elegant proportions, has been called *E. tortor* (Cope). Its slenderness of body was remarkable, and the large head was long and lance-shaped. Its flippers tapered elegantly, and the whole animal was more of serpent than any other of its tribe. Its lithe movements brought many a fish to its knife-shaped teeth, which are more efficient and numerous than in any of its relatives. It was found coiled up beneath a ledge of rock, with its skull lying undisturbed in the centre. A species distinguished for its small size and elegance is *Clidastes pumilus* (Marsh). This little fellow was only twelve feet in length, and was probably unable to avoid occasionally furnishing a meal for some of the rapacious fishes which abounded in the same ocean.

"The flying saurians are pretty well known from the descriptions of European authors. Our Mesozoic periods had been thought to have lacked these singular forms until Professor Marsh and the writer discovered remains of species in the Kansas chalk. Though these are not numerous, their size was formidable. One of them, *Ornithochirus harpyia* (Cope) spread eighteen feet between the tips of its wings, while the *O. umbrosus* (Cope) covered nearly twenty-five feet with his expanse. These strange creatures flapped their leathery wings over the waves, and, often plunging, seized many an unsuspecting fish, or, soaring at a safe distance, viewed the sports and combats of the more powerful saurians of the sea. At nightfall we may imagine them trooping to the shore and suspending themselves to the cliffs by the claw-bearing fingers of their wing-limbs.

"Tortoises were the boatmen of the Cretaceous waters of the Eastern coast, but none had been known from the deposits of Kansas until very recently. But two species are on record; one, large and strange enough to excite the attention of naturalists, is the *Protostega gigas* (Cope). It is well known that the house or boat of the tortoise or turtle is formed by the expansion of the usual bones of the skeleton till they meet and unite, and thus become continuous. Thus the lower shell is formed of united ribs of the breast and of the breast-bone, with bone deposited in the skin. In the same way the roof is formed by the union of the ribs with bone deposited in the skin. In the very young tortoise the ribs are separate, as in other animals; as they grow older they begin to expand at the upper side of the upper end, and with increased age the expansion extends throughout the length. The ribs first come in contact where the process commences, and in the land-tortoise they are united to the end. In the sea-turtle the union ceases a little above the ends. The fragments of the *Protostega* were seen by one of my party projecting from the ledge of a low bluff. Their thinness and the distance to which they were traced excited my curiosity, and I straightway attacked the bank with the pick. After several square feet of rock had been removed, we cleared up one floor, and found ourselves well repaid. Many long, slender pieces of two inches in width lay upon the ledge. They were evidently ribs with the usual heads, but behind each head was a plate like the flattened bowl of a huge spoon, placed crosswise. Beneath these stretched two broad plates, two feet in width and no thicker than binder's board. The edges were fingered, and the surface hard and smooth. All this was quite new among full-grown animals, and we at once determined that more ground must be explored for further light. After picking away the bank and carving the soft rock, new masses of strange bones were disclosed. Some bones of a large paddle were recognized, and a leg-bone. The shoulder-blade of a huge tortoise came next, and further examination showed that we had stumbled on the burial-place of the largest species of sea-turtle yet known. The single bones of the paddle were eight inches long, giving the spread of the expanded flippers as considerably over fifteen feet. But the ribs were those of an ordinary turtle just born, and the great plates represented the bony deposit in the skin, which, commencing independently in modern turtles, unite with each other below at an early day. But it was incredible that the largest of known turtles should be but just hatched, and for this and other reasons it has been concluded that this 'ancient mariner' is one of those forms not uncommon in old days, whose incompleteness in some respects points to the truth of the belief that animals have assumed their modern perfections by a process of growth from more simple beginnings.

"The Cretaceous ocean of the West was no less remarkable for its fishes than for its reptiles. Sharks do not seem to have been so common as in the old Atlantic, but it swarmed with large predaceous forms related to the salmon and saury.

"Vertebræ and other fragments of these species project from the worn limestone in many places. I will call attention to perhaps the most formidable as well as the most abundant of these. It is the one whose bones most frequently crowned knobs of shale which had been left standing amid surrounding destruction. The density and hardness of the bones shed the rain off on either side, so that the radiating gutters and ravines finally isolated the rock-mass from that surrounding. The head was as long as, or longer than, that of a fully-grown grizzly bear, and the jaws were deeper in proportion to their length. The muzzle was shorter and deeper than that of a bull-dog. The teeth were all sharp cylindric fangs, smooth and glistening, and of irregular size. At certain distances in each jaw they projected three inches above the gum, and were sunk one inch into the jaw-margin, being thus as long as the fangs of a tiger, but more slender. Two such fangs crossed each other on each side of the middle of the front. This fish is known as *Portheus molossus* (Cope). Besides the smaller fishes, the reptiles no doubt supplied the demands of his appetite.

"The ocean in which flourished this abundant and vigorous life was at last completely enclosed on the west by elevations of sea-bottom, so that it only communicated with the Atlantic and Pacific at the Gulf of Mexico and the Arctic Sea. The continued elevation of both eastern and western shores contracted its area, and when ridges of the sea-bottom reached the surface, forming long, low bars, parts of the water-area were enclosed and connection with salt water prevented. Thus were the living beings imprisoned and subjected to many new risks to life. The stronger could more readily capture the weaker, while the fishes would gradually perish through the constant freshening of the water. With the death of any considerable class the balance of food-supply would be lost, and many larger species would disappear from the scene. The most omnivorous and enduring would longest resist the approach of starvation, but would finally yield to inexorable fate; the last one caught by the shifting bottom among shallow pools, from which his exhausted energies could not extricate him."

SNAKE RIVER.

The Snake or Lewis Fork of the Columbia heads in the Yellowstone National Park, opposite the heads of the Madison and Yellowstone Rivers. Its sources are in beautiful lakes embosomed in heavily-wooded hills. Flowing southward, it soon enters a mountainous country, from which it receives several large tributaries—Barlow's Fork, Buffalo Fork, Gros Ventre Creek, and Hoback River. It washes the east base of the Teton Range, which rears its rugged Gothic spires seven thousand feet above its valley. Turning to the west, the river cuts across the mountains which seek to check its course in a terrific gorge wellnigh impassable. On the west side of these mountains it enters upon a great field of basalt, a great volcanic plain covered with drifting sand and seamed with crevasses like those of a glacier. This is known as the Snake River Plain. It crosses this plain by a southerly course, then gradually sweeping around to the westward, it hugs the southern border of this basalt field as far as longitude 117°, when it turns northward, then for a short distance westward again to its junction with Clark's Fork, making the mighty Columbia.

In its course across and around the basalt plain it is rapid and tumultuous, boiling and seething along, its bed broken by boulders and ledges. In several places there are noteworthy falls. The upper of these is the American Fall, at a point a few miles below the mouth of the Portneuf, where the "Mad" River—as it was called in early days—leaps over a wall of basalt. Farther down is the Shoshone Fall, by far the greatest and finest on the river. This fall was visited in October, 1868, by Mr. Clarence King, and I quote his fine description of it:

"The wall of the gorge opposite us, like the cliff at our feet, sank in perpendicular bluffs nearly to the level of the river. A horizon as level as the sea; a circling wall, whose sharp edges were here and there battlemented in huge fortress-like masses; a broad river, smooth and unruffled, flowing quietly into the middle of the scene, and then plunging into a labyrinth of rocks, tumbling over a precipice two hundred feet high, and flowing westward in a still deep current to disappear behind a black promontory. . . . . Dead barrenness is the whole sentiment of the scene. . . . .

"In plan the fall recurves up-stream in a deep horseshoe, resembling the outline of Niagara. The total breadth is about seven hundred feet, and the greatest height of a single fall about one hundred and ninety. . . . . The whole mass of the fall is one ever-varying sheet of spray. In the early spring, when swollen by the rapidly-melted snows, the river pours over with something of the volume of Niagara. . . . . There are no rocks at the base of the fall. The sheet of foam plunges almost vertically into a dark, beryl-green lake-like expanse of the river. Immense volumes of foam roll up from the cataract-base, and, whirling about in the eddying winds, rise often one thousand feet into the air. . . . . The incessant roar, reinforced by a thousand echoes, fills the cañon."

HIGH MOUNTAIN-PEAKS.

Southward from the Wind River chain the mountainous character of the Divide or continental watershed is interrupted for a short distance by comparatively level plateaus, while to the east are the Laramie Plains, bounded by a comparatively low range, of which Laramie Peak is about ten thousand feet high, and, on account of its isolation and the insignificance of the mountains in the vicinity, is one of the great landmarks of the West. Still farther south are the remarkable mountain-regions and the parks of Colorado. The Colorado or Front Range rises up before the traveller on the plains like a gigantic wall, with Long's Peak at the north and Pike's Peak at the south as high bastions. West of this range are three great depressions, North, Middle, and South Parks. In the Front Range are several peaks over fourteen thousand two hundred feet high (according to the latest surveys)—Long's, 14,271 feet; Evans's, 14,330 feet; and Gray's and Torrey's, twin-peaks, with an interval of less than a mile, 14,341 and 14,336 feet. In this range are the oldest known silver- and gold-mines in Colorado. On the west side of the parks is the Park range, in which are several peaks of over thirteen thousand feet, and a few, as Mount Lincoln, of over fourteen thousand feet. From Mount Lincoln one can look down into the valley of the upper Arkansas River and across to the Sawatch range, one of the most remarkable in the West. At its north end is the Holy Cross group, in latitude 39° 30′ and longitude 106° 33′, composed of gneiss and coarse massive granite. For eighty miles to the southward this range literally bristles with peaks, many of which rise over fourteen thousand feet. Harvard, Yale, and Princeton are respectively 14,384, 14,150, 14,199 feet, and many others are over thirteen thousand feet. The rocky mass is mostly granite, intersected with igneous dikes. The general trend of this range is about 20° west of north, and it forms one of the most gigantic anticlinals in the entire Rocky Mountain region. Vast ranges of massive granitic rock, capped with limestone and sandstone, incline from either side, with broad valleys intervening. The proofs of ancient glacial action on both sides of the range are wonderful. In the valley of Roches Moutonnées Creek, which flows into Eagle River from its north-east base, are very remarkable rounded masses of granite. Such have long been called in Swiss geology sheep-backs, or *roches moutonnées*. Here they are shown on a grand scale. In the valley of the Arkansas or the Gunnison are marvellous examples of lateral and terminal moraines, and there are numerous lakes whose basins have been scooped out by some extended glacial action. The Twin Lakes are beautiful sheets of water on the east side of the Sawatch range, from two to three miles in diameter and about eighty feet deep. These are two glacial lakes. The proofs of glacial action are common throughout the Rocky Mountain region, but they are nowhere shown to a more marked extent east of the Sierra Nevadas than in the Sawatch range. From the west side of this range flow the Gunnison River and the southern branches of the Grand, which, after cutting deep cañons or gorges, unite near the western boundary of Colorado; and, cutting a still deeper cañon, the stream flows into the great Colorado of the West. West of the Sawatch or great "Mother" (Madre) range is another remarkable group in the drainage that leads to the great Colorado, called the Elk range. It is about fifty miles in length, with a trend about north-west and south-east, and differs from any of the others mentioned both in form and structure. In this range are seven peaks of the first order, rising to an elevation of nearly fourteen thousand feet, and many others ranging from twelve to thirteen thousand feet. The geological structure is very peculiar. It appears that the vast thickness of sedimentary strata once rested upon a floor of igneous granite in a pasty or semi-pasty condition, and that these high peaks were thrust up through the overlying beds, in many instances completely overturning them for miles in extent. There are faults two thousand feet in extent, and dikes without number where the igneous material seems to have been squeezed through fissures into thousands of feet of overlying strata, vertically as well as horizontally. Deep gorges and amphitheatres meet the eye on every side. Snow-mass Peak, 13,961 feet high, is so called from the immense mass of perpetual snow on its side. At its immediate base, on all sides, are beautiful lakes, the surface is remarkably rugged, and as far as the eye can reach on every side are high peaks, with deep gorges in one continuous succession, while the sedimentary rocks are thrown into chaos. On the north-west end of the range is a remarkable peak which forms an excellent landmark, known among miners and prospectors for years as Sopris Peak, 12,972 feet high. From this point the land slopes off into the remarkable plateau country bordering on the Colorado River, literally gashed, as it were, by the little streams which have cut innumerable cañons through it. There is probably no country in the world that presents more obstructions to the traveller.

At first glance, the Park range appears to be connected with the Sangre de Cristo range, which bounds the east side of the San Luis Valley; but the former is separated from the latter by the Arkansas Valley, and really lies parallel with it. It begins in latitude 38° 26′ and longitude 106°, trends south 30° east, and shows on its summit a continuous series of sharp peaks. Parallel to it on the east, and bordering the plains, is the Wet Mountain range. The interval is known as the Wet Mountain Valley and Huerfano Park, one of the most beautiful and fertile districts in Colorado. These mountains extend far down into New Mexico. Southward, the Sierra Blanca and the Spanish Peaks are lofty landmarks. Fort Garland, an old military post in the San Luis Valley, though nearly surrounded with high ranges is not a park, but a valley thirty to fifty miles wide, through which the Rio Grande flows after emerging from the San Juan Mountains, cutting a gorge through its basaltic floor one thousand to fifteen hundred feet in depth for sixty to eighty miles.

Immediately west of the upper portion of the San Luis Valley, in South-western Colorado, is a most interesting as well as lofty group of mountains, forming what is now called the San Juan district. These mountains give origin to a great number of streams. On the north are many branches of the Gunnison, on the east the Rio Grande, and on the south and west the various branches of the San Juan, which flow southwest and west, and unite with the Colorado. Within an area of about four thousand square miles is the most important and rugged group of peaks in Colorado, and probably in this portion of the mountain-region of the West. More than one hundred points are above thirteen thousand feet high, and about ten peaks are over fourteen thousand feet. Large areas here are composed entirely of quartzites, and others wholly of igneous rocks. Toward the south, in Southern Colorado and in New Mexico and Arizona, the volcanic action seems to have been very great, and the area covered with igneous rocks increases; sometimes they occupy several thousand square miles to the exclusion of all others. What are called the broad table-lands or mesas of New Mexico are simply floors of basalt. Colorado may be regarded as the culminating area of lofty points in the eastern division of the Rocky Mountain region, as California is in the Sierra Nevada ranges. Within the limits of Colorado are fifty or more points exceeding fourteen thousand feet in height, and more than two hundred and fifty of over thirteen thousand feet, while the number reaching thirteen thousand feet is unknown. The average elevation of Colorado State is greater than that of any other State or Territory in the Union, being six thousand six hundred feet, while California, with its magnificent group of peaks in the Sierra Nevada, averages only two thousand eight hundred feet.

THE PLATEAU REGION OF THE COLORADO RIVER.—GENERAL VIEW.

The country drained by the Colorado River is a peculiar region. It is a country of plateaus and cañons, the plateaus mainly arid and sterile, where the new streams flow in deep gorges far below the surface.

The longest and most northern branch of the Colorado is Green River, which heads in the Wind River Mountains, against the sources of the Big Horn and the Snake Rivers. This stream, in its long course toward the south, receives the waters of the Uintah from the west and the Yampah and White Rivers from the east. Near latitude 38° 15′ and longitude 110° it is joined by the Grand River, a stream of nearly equal size, which heads in Middle Park, Colorado, drawing its first supplies of water from the snow-fields of Long's Peak. The stream below the junction of these two forks is known as the Colorado.

Below their junction the principal branches of the Colorado from the east are the San Juan, the Colorado Chiquito or Flax River, William's Fork, and the Gila; on the west, the Dirty Devil, Paria, and Virgen.

This region is limited on the east, north, and north-west by high mountain-ranges. Its surface is nearly flat, but by no means unbroken. There is little rolling or undulating country. Changes of level take place by very gentle uniform slopes or by abrupt precipitous steps. A large part of the surface consists of bare rocks, with no soil or vegetation. A part is covered with a thin sandy soil, which supports a growth of sage and cacti, or even a few piñon pines and cedars. The only vegetation is that eminently characteristic of an arid country.

This aridity has modified orographic forms to an astonishing degree. Where, under different climatic conditions, there would be produced a region similar in most respects to the prairies of the Mississippi Valley, we find a country flat indeed or inclined at low angles, but one whose watercourses are far beneath the general level, deep down in cañons, hundreds, thousands of feet beneath the surface. Great cliffs, thousands of feet in height and extending like huge walls for hundreds of miles, change the level of the country at a single step. Isolated buttes and mesas of great height are scattered over the plateaus, indicating the former height of the plain of which they formed parts.

"The landscape everywhere away from the river is of rock—cliffs of rock, tables of rock, plateaus of rock, terraces of rock, crags of rock—ten thousand strangely-carved forms. Rocks everywhere, and no vegetation; no soil; no land. . . . . When speaking of these rocks, we must not conceive of piles of boulders or heaps of fragments, but a whole land of naked rock, with giant forms carved on it—cathedral-shaped buttes, towering hundreds or thousands of feet; cliffs that cannot be scaled; and cañon-walls that shrink the river into insignificance, with vast hollow domes and tall pinnacles, and shafts set on the verge overhead, and all highly colored—buff, gray, red, brown, and chocolate; never lichened, never moss-covered, but bare, and often polished."

The above description by Major J. W. Powell, who has explored the cañons of the Colorado, gives a graphic pen-picture of the lower and more arid plateaus of this region.

Nearly every watercourse, whether perennial or not, is a cañon—a narrow valley with precipitous walls, often of enormous height. In many cases these cañons are so numerous that they cut the plateau into shreds—a mere skeleton of a country. Of such a section Lieutenant Ives, who explored the course of the Lower Colorado, writes: "The extent and magnitude of the system of cañons in that direction is astounding. The plateau is cut into shreds by these gigantic chasms, and resembles a vast ruin. Belts of country miles in width have been swept away, leaving only isolated mountains standing in the gap; fissures so profound that the eye cannot penetrate their depths are separated by walls whose thickness one can almost span, and slender spires that seem tottering on their base shoot up a thousand feet from vaults below."

But few of these cañons contain water throughout the year. Most of them are dry at all times excepting for a few days in the early spring or for a few minutes or hours at most after a heavy shower. It is a characteristic of Western North America, as of all arid countries, that the streams, away from their sources in the mountains, lose water, rather than gain it, in traversing the lower country. The dry atmosphere and the thirsty soil absorb it, and in very many cases large streams entirely disappear in this way. This is the case to a great extent in the plateau country, and still more so in the Great Basin, where these are the only outlets to the drainage.

A few words will suffice to sketch the manner in which the climate has acted in producing these strange and unique orographic effects. The great degree of aridity of the atmosphere and the slight rainfall, coupled with its sudden explosive character, render plant-life very limited in amount. The soil, having little or no protection against the sudden floods, is washed away as fast, or nearly as fast, as it is formed; or, in other words, transportation nearly or quite keeps pace with disintegration. The rains, coming as they always do in floods, run immediately off the bare rock or over and through the thin sandy soil, sweeping it with them, and, collecting in the little runs with incredible rapidity, rush down them in great body and with great velocity, sweeping everything before them. The waters are turbid and thick with sediment, coarse and sharp-edged from the rapid cutting of the rocks. It is this detritus which Dame

Nature uses as her chisel in carving cañons, cliffs, buttes, and the other quaint and curious forms which one meets in this strange land. A clear stream, whatever may be its velocity, has little erosive power; but put these tools in its possession, give it the quantity of coarse sand and gravel which the Colorado and its tributaries always hold in suspension, and its cutting power is enormous. The difference in climatic conditions between the district under discussion and the plains is one of degree only, but it is sufficient to produce very marked differences in orographic forms. Wherever the climatic conditions are such that soil can be formed and be covered with vegetation, there cañons cannot be produced, other than as gaps for the passage of streams through mountain-ranges; and, in proportion as the climate becomes more arid, so will the country approach in its physical features a cañon-land.

While every stream in this region flows in a cañon—and there are thousands of cañons which contain no water whatever—the most remarkable succession of these clefts is that on the main stream of the region, the Colorado, and its main branch, the Green. The lower cañons of the river were explored in 1857 by Lieutenant Ives as far as the head of the Black Cañon. In 1869, Major J. W. Powell explored the main portion of the river in boats. He started from Green River City, in Southwestern Wyoming, and safely threaded the devious path of the cañons as far as the mouth of the Grand Wash, a distance of one thousand miles. Throughout this distance there are but few miles where the river is not deep in the bowels of the earth.

The following vivid description of the Grand Cañon cannot fail to be read with interest:

"The walls now are more than a mile in height, a vertical distance difficult to appreciate. . . . . A thousand feet of this is up through granite crags, then steep slopes and perpendicular cliffs rise, one above another, to the summit. The gorge is black and narrow below, red and gray and flaring above, with crags and angular projections on the walls, which, cut in many places by side-cañons, seem to be a vast wilderness of rocks. Down in these grand, gloomy depths we glide, ever listening, for the mad waters keep up their roar; ever watching, ever peering ahead, for the narrow cañon is winding and the river is closed in, so that we can see but a few hundred yards, and what there may be below we know not; but we listen for falls and watch for rocks, or stop now and then in the bay of a recess to admire the gigantic scenery. And ever as we go there is some new pinnacle or tower, some crag or peak, some distant view of the upper plateau, some strange-shaped rock, or some deep, narrow side-cañon. Then we come to another broken fall, which appears more difficult than the one we ran this morning.

"Clouds are playing in the cañon to-day. Sometimes they roll down in great masses, filling the gorge with gloom; sometimes they hang above from wall to wall, and cover the cañon with a roof of impending storm; and we can peer long distances up and down this cañon-corridor, with its cloud-roof overhead, its walls of black granite, and its river bright with the sheen of broken waters. Then a gust of wind sweeps down a side-gulch, and, making a rift in the clouds, reveals the blue heavens, and a stream of sunlight pours in. Then the clouds drift away into distance, and hang around crags and peaks and pinnacles and towers and walls, and cover them with a mantle that lifts from time to time and sets them all in sharp relief. Then baby-clouds creep out of side-cañons, glide around points, and creep back again into more distant gorges. Then clouds set in strata across the cañon, with intervening vista-views to cliffs and rocks beyond. The clouds are children of the heavens, and when they play among the rocks they lift them to the region above. . . .

"The varying depths of this cañon, due to the varying altitudes of the plateaus through which it runs, can only be seen from above. As we wind about in the gloomy depths below, the difference between four thousand and six thousand feet is not discerned, but the characteristics of the cañon—the scenic features—change abruptly with the change in the altitude of the walls as the falls are passed. In running the channel which divides the twin plateaus we pass round the first great southern bend. In the very depths of the cañon we have black granite, with a narrow cleft through which a great river plunges. This granite portion of the walls is carved with deep gulches and embossed with pinnacles and towers. Above are broken, ragged, nonconformable rocks, in many places sloping back at a low angle. Clambering over these, we reach rocks lying in horizontal beds. Some are soft, many very hard; the softer strata are washed on, the harder remain as shelves. Everywhere there are side-gulches and cañons, so that these gulches are set about ten thousand dark, gloomy alcoves. One might imagine that this was intended for the library of the gods; and it was. The shelves are not for books, but form the stony leaves of one great book. He who would read the language of the universe may dig out letters here and there, and with them spell the words, and read, in a slow and imperfect way, but still so as to understand a little, the story of creation."[*]

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[*] *Exploration of the Colorado River of the West*: Washington, 1875; pp. 83, 85, 193, 194.

RUINS IN THE SOUTH-WESTERN TERRITORIES.

In the Territories bordering upon the Colorado drainage-system are found ruins and other remains of a people evidently more or less distinct from the Mound-builders, and probably much more closely related to the Aztecs of Mexico. All over Arizona, the western half of New Mexico, the south-western portion of Colorado, the southern part of Utah and Nevada, with the south-eastern portion of California, are found the ruins of structures raised by this people. They resemble in many important particulars the towns and houses of the Moquis and Pueblo Indians of the present day, which are described elsewhere in this volume, and who are probably the last remnants of a once great race which covered this region at one time with a dense population.

These ruins, in their locations and characters, serve to sketch in rough outline the history of this people—their peaceful, quiet, pastoral, and agricultural lives, then the rude onslaught upon them by the barbarous tribes from the North, who drove them from their indefensible agricultural towns, first, to take shelter upon the summits of high mesas, and then, as they became weaker and less able to cope with their formidable enemies, to the clefts and crannies of the rocks, to the most inaccessible places which Nature had provided. So we can easily distinguish two entirely different classes of structures—first, the agricultural settlements; and second, those used as fortresses or retreats in time of war.

Those of the first class were built in the fertile river-bottoms, close to water and arable land. The houses were mainly communal, several stories high, similar to the pueblos of the present day. They were made of stone, laid in more or less regular courses in mortar, or of adobe (sun-dried) brick. In their ground-plan these communal houses are rectangular, circular, or elliptical, or, more rarely, of irregular form. They are usually built around or nearly around a rectangular or circular court, into which the houses open, while on the outside the structure presents a blank wall, broken only by small apertures which served as windows.

In every town has been found one or more *estufas*, or sweat-houses, as they are called, for the sake of a name. The building or room is rectangular or circular, and much more commonly the latter. In some cases, however, it is an underground apartment. However built, it is always with very great care, and oftentimes with a view to architectural effect. It is usually the most pretentious building in the settlement. A very common form is that of a tower, usually with a double wall, the annular space between the two walls being subdivided into rooms. One of these having a triple wall has been found. It is probable that this building was used as a place of worship or was in some way connected with their religion. It may also have been used as the council-house where the grave affairs of state were discussed.

At a locality in South-western Colorado known as Aztec Spring is situated one of the largest of these towns. The mass of ruins—for the town is in a very ruinous state—covers an area of about four hundred and eighty thousand square feet, and is about three to four feet in depth, making one million five hundred thousand cubic feet of masonry. The stone used is from a cliff fully a mile away. At Ojo Caliente, New Mexico, are the ruins of another large town. It is placed upon a high terrace near Caliente Creek. It was built chiefly of adobe, and consisted of rows of rooms built around central courts. On the Rios San Juan, Chaco, and De Chelly are found a number of other towns more or less similar.

The second class of structures—those built mainly for purposes of defence—are in general in a much better state of preservation, owing in part to their more sheltered position, but mainly, undoubtedly, to the fact that they are of a somewhat more recent date, as indicating a later chapter in the history of this people. Some of them, and perhaps the more elaborate structures, are built upon the summits of almost inaccessible mesas, as are the Moquis' towns of the present day. Here are found round towers of considerable height, serving not only as fortresses but as watch-towers. But the cave-dwellings, as they are called, are by far the more numerous and interesting. This country, as was stated in the geographical description, is very arid. There are but few streams, and most of these traverse the country deep down below the surface in cañons, with rocky, precipitous walls. Different strata in these cañon-walls have been eroded in different degrees, so that one finds horizontal caves in the walls where one of the horizontal beds has weathered back a few feet farther than the harder beds above and below it. In many cases where these caves have occurred part-way up a cliff these people—sore beset by their enemies—have built places of refuge, secure from attack from above by reason of the overhanging cliff, and nearly so from below, as the occupants had to depend upon ladders or steps cut in the nearly perpendicular face of rock. Travelling down the cañon of the Rio Mancos in South-western Colorado, one sees everywhere on the walls which encompass him on either hand these structures, like swallows' nests, in the clefts and crannies of the rocks. In some cases there are quite large groups of houses, well built of stone, even two stories in height. In others a simple wall has been thrown up across the front of a crevice.

Other traces of this ancient people are not wanting. Great areas—hundreds of square miles, indeed—are so thickly strewn with fragments of pottery that one may ride for days and at every step his horse's hoofs will strike them. Few whole vessels have been found in the ruins. They have been thoroughly explored by the Indians, who have taken almost everything of value to them. The pottery resembles very closely, in material and in the designs painted upon it, that of the Moquis and Pueblo people of the present, but in quality it is vastly superior to the latter. Again, in many localities arrow-heads of chalcedony and obsidian have been found in abundance, indicating the scenes of many a bloody conflict.

As to the age of these ruins little is known. It is certain that they date back several centuries, undoubtedly before the first Spanish conquest, and a few facts point to a very great antiquity. That they may have been a colony of the Aztecs, founded by them in their southward migration to the table-lands of Mexico, is not improbable. But few facts are known on which to base a theory.

THE GREAT BASIN.

Between the Wahsatch range and the Sierra Nevada lies a great area which has no outlet to either ocean—an area containing many great ranges of mountains, with broad valleys at their bases; but the mountains send down to the plains few permanent streams, and nearly all of these are absorbed by the thirsty soil immediately, or flow into salt lakes to feed the increasing thirst of the dry atmosphere.

On the east this region is tolerably well defined by the Wahsatch and other ranges—on the west by the Sierra Nevada. On the north and south, however, its limits are not sharply defined, the divides being in most cases mere swells in otherwise flat valleys.

The scenery in the vicinity of the Wahsatch Mountains has long been celebrated for its grandeur and beauty. Mount Nebo, one of its prominent peaks and a noted landmark, is 11,992 feet high. The trend of this range is nearly north and south, while projecting like a spur toward the east is the Uintah range, with a trend nearly east and west, and with a number of peaks over thirteen thousand feet high. This is one of the most beautiful and symmetrical ranges in the West. The nucleus is composed of quartzites, which are so elevated that the central mass seems to have been lifted up horizontally or nearly so. The entire range is a remarkable example of a huge anticlinal, and on either side of the axis are the numerous pyramidal peaks, rising far above the timber-line and covered with perpetual snow. Three distinct belts may be noted in this range—one above the timber-line, revealing only the bare, bleak rocks; below, a dense belt of pine timber; and near the base and sloping off into the plains, another comparatively barren belt. The Wahsatch range has a gray granite nucleus, with a great thickness of sedimentary beds lying on the sides and often rising to the very summits. In the Great Basin between the Wahsatch Mountains and the Sierra Nevada are many smaller mountain-ranges, lying nearly parallel with each other, some of which seem to rise abruptly out of the surrounding plateau. This great depression was undoubtedly at no remote period, geologically speaking, a lake of several hundred miles in extent, out of whose waters the summits of the mountains projected like islands. In the Shoshone Basin, forming the eastern portion of Oregon and west part of Idaho, are a great number of similar ranges, all lying parallel with each other, appearing like the waves of the sea after a storm. The Salmon River Mountains, Blue Mountains, and many others are composed of a series of remarkably regular ridges, trending mainly north and south. Between the mountain-ranges in the Great Basin are valleys of greater or less breadth, floored with a modern Pliocene formation, which in turn is covered with detritus, so that their bases are concealed. The mountains and plain show proof of immense erosion, so that the mountain-ranges themselves are only remnants of their former magnitude. They are composed largely of sedimentary rocks, mostly metamorphosed; also of granitic and volcanic rocks. The valleys are really arid deserts to a great extent, with very little water the greater portion of the year. A few springs here and there supply the thirsty traveller. Immediately around Great Salt Lake are numerous valleys watered by the streams that flow from the mountains, and in such cases the soil is remarkably productive.

In this basin are some quite large rivers, as the Humboldt, Sevier, Jordan, Bear, etc. Jordan and Bear Rivers are large streams, but pour their waters into Great Salt Lake, which has no outlet. Humboldt River takes its rise in the Humboldt range, flows south-westward, and is lost in Humboldt Lake, or "Sink," as it was called by the early pioneers. Sevier is a very sinuous stream, waters a narrow valley, and disappears in Sevier Lake.

The following general description of the features of the Great Basin is found in the *Report of the U. S. Geological Survey for 1870*, made by Dr. Hayden:

"Let us for a moment take a bird's-eye view of the great inland basin of which Salt Lake Valley forms only a part. We shall find that what is termed the Great Basin of the West comprises the vast area enclosed by the Wahsatch Mountains on the east and the Sierra Nevada on the west, the crest or water-divide of the Columbia on the north, and that of the Colorado on the south. We shall also observe that this great region has no visible outlet; that it is composed of a multitude of smaller basins or valleys, each of which has its little lakes, springs, and watercourses, their surplus water either evaporating or sinking beneath the surface. If we examine the elevations in this region, we observe a wonderful uniformity in the surface of the valleys, and find that none of them are much above the level of the waters of Great Salt Lake. . . . . I infer that a fresh-water lake once occupied all this immense basin; that the smaller ranges of mountains were scattered over it as isolated islands, their summits projecting above the surface; that the waters have gradually and slowly passed away by evaporation, and the terraces are left to reveal certain oscillations of level and the steps of progress toward the present order of things; and that the briny waters have concentrated in those lake-basins which have no outlet."

GREAT SALT LAKE.

The principal lake in the Great Basin is Great Salt Lake, which receives its principal waters from the Wahsatch Mountains. It might be called a vast inland sea, as it occupies an area of 2360 square miles. It is quite shallow, frequently not more than from ten to twenty feet, and its greatest depth not far from sixty feet. Having no outlet, the evaporation is very great. The amount fluctuates, somewhat depending upon the character of the seasons. However, the surface has gradually risen since 1849 about eleven feet, and the area covered by the lake is said to be forty per cent. greater, indicating an important increase in the moisture of the climate in later years.

Great Salt Lake is but the ruin of a much grander lake which in ages past covered a large part of the area of the Great Basin. The shore-line of this great lake—for which the name of Bonneville has been proposed—is yet distinctly marked high up on the slopes of the Wahsatch and other ranges in this part of the basin, 970 feet above its present surface. At that time it had an outlet, draining northward into the Snake or Lewis Fork of the Columbia. During the process of desiccation of the country, caused by the rise of the Sierra Nevada, the lake receded, but its recession was checked for greater or less intervals, which are indicated by minor beach-lines which form a succession of steps upon the mountain-side.

The waters of this lake are said to be the strongest brine known. The human body floats almost entirely on the surface. At the time of Captain Stansbury's survey in 1850 the water contained 22.4 per cent. of solid matter; at present the percentage of solid matter is much less. In 1869 it was reduced to 14.8. An analysis of the solid matter by the survey of the 40th parallel (vide *Rept. Sur. 40th Par.*, vol. ii. p. 433) gave in 150 parts—

Magnesia	6.301
Lime	0.357
Soda	66.978
Potassa	2.901
Sulphuric acid	8.215
Chlorine	83.946
	168.698
Less oxygen of soda and magnesia	18.758
	149.940

or, in other words—

Chloride of sodium	79.11
Chloride of magnesium	9.95
Sulphate of soda	6.22
Sulphate of potassa	3.58
Sulphate of lime	0.57
Excess of chlorine	0.57
	100.00

The elevation of the lake above sea-level is 4218 feet.

THE NORTHERN SYSTEM OF MOUNTAINS.

A grand system of mountains stretches from the Arctic Ocean on the north to Mexico on the south, fronting the Pacific Ocean. Portions of this system are known as the Cascade, the Sierra Nevada, Coast Range, etc. These mountains, as they extend into Mexico, have long been known as the Cordilleras of Mexico, and the main ranges of South America bear the name of Cordilleras or Andes. As Professor Whitney insists, priority would demand that the appellation of "Cordilleras" be continued to this great group of mountains in their extension northward on the Pacific coast to British America. I therefore regard it as just that the term "Cordilleras" shall be used as the main generic term, while the more indefinite term, "Rocky Mountains," should fall under it as sub-generic. The term "Rocky Mountains" has been so long applied to the eastern division that this section, including as it does the water-divide of the continent, should not have its weight or importance diminished in our geographical nomenclature. This becomes the more important if, as I believe, all the great groups of mountains west of longitude 105° will be found, when carefully studied, to be a unity in a general geographical and geological point of view.

North of latitude 49° but little is known of these western ranges, but it is known that they extend without any permanent interruption to the Arctic Ocean, with here and there a lofty peak, which from ignorance of its precise character has been assigned a greatly exaggerated elevation. In regard to the height of these peaks there is a great disagreement among observers. Mount Hood was ascended in 1864 by Messrs. Wood and Atkinson, and pronounced 17,430 feet above sea-level. In 1867 Lieut.-Col. Williamson, with excellent and reliable instruments, found its height to be only 11,225. Professor Whitney's trigonometrical measurement of the same peak showed, by a rough calculation, about 11,700 feet. The latter measurements are undoubtedly very nearly correct. The same discrepancies exist in regard to the elevation of the other mountain-peaks, but careful instrumental measurements have reduced them to a moderate figure. Mount Baker and Mount Hood, both of which are enormous volcanic cones, may be regarded as respectively about 11,100 and 11,225 feet. The elevation of Mount Ranier, or Lachoma, may be regarded as pretty definitely settled by the observations of Professor Davidson of the U. S. Coast Survey at 14,444 feet—four feet higher than Mount Shasta, and therefore the most elevated point in the Cascade range.

The Cascade Range is a continuation northward of the Sierra Nevada or Snowy Range, and is separated only by the chasm of the Klamath River. Through the entire length of Oregon and Washington Territories the Cascade Range runs north and south, parallel to, and about one hundred miles from, the Pacific shore. Near the 49th parallel it is bent north-westerly, conforming with the trend of the coast, and in British Columbia is called the Marine Range. The average elevation is five to six thousand feet. It obtained its name from the Cascades of the Columbia, which are formed by the passage of that river through it. The country along the immediate coast is but a narrow belt, much broken, while the shore is indented with great numbers of bays or inlets, of which the estuary of the Columbia, Shoalwater Bay, and Gray's Harbor are noted. Promontories and rocky islets are visible everywhere as surviving monuments of the terrific erosion which has swept away entire mountain-ranges, leaving at this time only the single group of the Cascade range. A few of the peaks are said to be at times active volcanoes.

Mount St. Helen's is reported, upon good authority, as having in February, 1842, discharged lava, sending streams of it down its sides. Mount Baker is said to be still smoking, and others show some signs of volcanic activity.

South of Cape Mendocino, in latitude 40° 30′, to Point Conception, near latitude 34° 30′, the Coast Range of California is composed of a succession of parallel ranges, with intervening valleys of great beauty and fertility. Between the Coast Range and the Cascades is a longitudinal depression which forms the valley of the Willamette, extending northward to the Gulf of Georgia. Similar valleys occur in California, as the San Joaquin and Sacramento. In this northern region the forests are very dense, and the undergrowth so thick that it is difficult to penetrate it. Trees occur of majestic size, of which the yellow fir (*Abies Douglasii*) predominates over all others. The cedar (*Thuya gigantea*) is also very abundant. The lumber interests of this country are immense.

Between the Cascades and the eastern group of mountains lies the basin of the Columbia, which is an arid plain covered with artemisia or wild sage and bunch-grass. The surface is cut through by deep cañons, through which the large rivers flow between huge walls of basalt. Although there are great varieties of climate in this division, it is extremely mild on the immediate coast. At Puget Sound snow seldom falls, and remains but a short time. Rains are very abundant, reaching sixty inches during the year.

According to Professor J. D. Whitney, the Coast Range is coincident with the Sierra Nevada, both north and south. Near Lejon Pass, in latitude 35°, the ridges are topographically indistinguishable from each other, and it is only by carefully studying the position of the strata that it can be determined where one system begins and the other ends. The Coast Ranges are composed of newer formations than the Sierra, and have been subjected to greater disturbances up to a recent period; and they contain no rocks older than the Cretaceous.

In point of elevation the parts of this system vary widely. From three to four thousand feet above the sea in main height in North-western Oregon, it rises southward until in the southern part of this State, and in California nearly as far as the Bay of San Francisco, it has a mean height of not less than six thousand feet. The Bay of San Francisco lies just in the trend of this system, a great gap. South of it the ranges have much less height, reaching only two to three thousand feet above the sea. One of the most prominent peaks is Monte Diablo, rising right up from the bay to a height of three thousand eight hundred and sixty feet, and

WINTER FOREST SCENE IN THE SIERRA NEVADAS.

BY THOMAS MORAN.

commanding a most beautiful view of one of the finest harbors in the world lying spread out at the feet; while to the west, away across the yellow plain of the Sacramento Valley, stands the splendid panorama of the snowy crest of the Sierra Nevada.

THE SIERRA NEVADA.

The Sierra Nevada, or Snowy Range, forms the western border of the great continental plateaus, corresponding with the Rocky group on the east. While the base of the eastern mass is everywhere four to five thousand feet above the sea-level, and the descent to the sea imperceptible to the eye, the Sierra slopes rapidly, so that the sea-level is reached within one hundred miles. So far as now known, the highest peak of the United States is in the Sierra group—viz. Mount Whitney, 14,887 feet. The peak which is believed to be the next in height is in Southern Colorado—Blanca Peak of Sierra Blanca, 14,464 feet. The scenery of the Sierra group is of surpassing grandeur and beauty. There is not such a vast number of high peaks as in the Colorado group, but it may fairly claim the highest; and inasmuch as the surrounding country has a much lower altitude, there is a massiveness about this magnificent range that even the Sawatch of Colorado cannot boast. The Sierra chain is about four hundred and fifty miles in length, and averages about eighty miles in width, supposing its northern terminus to be at Lassen's Butte, latitude 40° 30′. The central mass or core is chiefly granite, with metamorphic slates on either side, capped with basaltic and other kinds of lava and heavy beds of ashes and breccia. All these rocks are visible from the Central Pacific Railroad between Truckee and Sacramento. The evidences of very modern volcanic action are visible everywhere. Even now there are numerous hot springs and geysers, as well as an occasional earthquake shock. The height of some of the dominating peaks is as follows: Mount Shasta, 14,442 feet; Mount Tyndall, 14,386; Mount Kaweah, 14,000; Mount Brewer, 13,886; Red Slate Peak, 13,400; Mount Dana, 13,277. On the mountains snow falls to the depth of forty or fifty feet, and much of it remains all the year. Enormous glaciers exist here even at the present time, and the evidences of ancient glacial action are wonderful. The worn and rounded granites of the Sierra Nevada were well adapted to preserve the records of the old glaciers, and they everywhere testify to the intensity of their former power. These old glaciers have been continued down to the present time in a modified condition. All the glaciers occur on the north side of the mountains, and are very numerous—now estimated, according to

Mr. John Muir, at sixty-five. The number known in the Alps is eleven hundred, of which about one hundred may be considered as primary. Some of these great masses of snow and ice, which are not considered true glaciers by good authority, are nearly as large as the Alpine—as the Lyell, North Kettle, and others not named. Although the existence of glacial phenomena on the Pacific slope has been known for many years, the subject has received comparatively little attention, but enough is known to invest them with the highest interest. Moraines and morainal lakes occur in the Sierras in great number. Lake Tenaya, at the head of the Merced River, or a branch of the same name, is a conspicuous example. Traces of the existence of an immense flow of ice are shown here in the valley occupied by the lake, according to Whitney, and the ridges on either side of the trail are so worn by glacial action that the rocks are slippery, rendering travel dangerous. In our country the Glacial period proper has passed away, and the masses of snow and ice that now remain behind are only remnants.

GLACIAL ACTION IN THE ROCKY MOUNTAINS.

All through the Rocky Mountain group, on both sides of the great Divide, are remarkable examples of glacial action—moraines and morainal lakes. In Central Colorado, in the Sawatch and Elk Mountains, are large areas of glaciated granites, which are usually called sheep-backs or *roches moutonnées*. The first true glaciers on the Atlantic slope or in the Rocky Mountain group were observed in the summer of 1878 by the writer in the Wind River Mountains, in Wyoming Territory. On the south-east side of Fremont's Peak are two fine long glaciers, occupying an area of about two square miles, which are now named the Upper and Lower Fremont Glaciers. The *nevé* is distinctly shown, and the crevasses produced by the slow movements are all large and well marked. Indeed, all the characters of a first-class Swiss glacier are found here. Several smaller ones are found in this range. Even these are comparatively only the very insignificant remnants of the immense glaciers of the true Glacial epoch. On the west side of the Wind River range the morainal ridges are of immense size, and glacial lakes of all sizes are scattered about in great numbers. There must have been here at one time a mass of snow and ice moving down into the plains sixty-five miles long and twelve to fifteen broad.

TIMBER-BELTS.

Four pretty well-marked belts of forest vegetation were observed by Whitney in the Sierra Nevada. The lowest is the foot-hills, with oaks, buckeyes, and small Digger pines; the second belt lies between four and five thousand feet, and consists of pitch-pine (*Pinus ponderosa*), bastard cedar, and Douglas spruce; the third zone, between seven and nine thousand feet, is that of firs, as *Picea grandis* and *amabilis*, tamarack-pine, etc.; and on the highest belt, above nine thousand feet, where vegetation begins to dwindle, a dwarf pine (*Pinus cristata*) is seen up to the level of perpetual snow.

There are great numbers of beautiful lakes in the Sierras, fed by the melting of the snows, among which are Lake Tahoe and Donner's Lake.

THE YOSEMITE VALLEY.

The Yosemite Valley, so remarkable for its rugged scenery, and which has been set apart by legislative action as a pleasure-ground, is in the Sierra. Through this valley flows the Merced River, and at its source is a fine group of mountain-peaks, thirteen thousand feet high, called the Merced group.

We cannot do better, in order to give a general idea of this remarkable natural feature, than to quote the description of this valley written by Professor J. D. Whitney in the *Guidebook of the Yosemite*, p. 84, *et seq.*:

"The Yosemite Valley is nearly in the centre of the State (California) north and south, and just midway between the east and west bases of the Sierra, here a little over seventy miles wide. . . . . The valley is a nearly level area, about six miles in length and from half a mile to a mile in width, and sunken almost a mile in perpendicular depth below the general level of the adjacent region. It may be roughly likened to a gigantic trough hollowed in the mountains, nearly at right angles to their regular trend. . . . . This trough . . . . is quite irregular, having several re-entering angles and square recesses, let back, as it were, into its sides; still, a general north-east by easterly direction is maintained in the depression until we arrive near its upper end, where it turns sharply, at right angles almost, and soon divides into three branches, through either of which we may, going up a series of gigantic steps as it were, ascend to the general level of the Sierra. Down each of these branches, or cañons, descend streams, forks of the Merced, coming down the steps in a series of stupendous waterfalls. At its lower end the valley contracts into a narrow gorge or cañon, with steeply-inclined walls, and not having the U-shape of the Yosemite, but the usual V-form of Californian valleys.

"The principal features of the Yosemite, and those by which it is distinguished from all other known valleys, are—first, the near approach to verticality of its walls; second, their great height, not only absolutely, but as compared with the width of the valley itself; and, finally, the very small amount of talus or débris at the base of these gigantic cliffs. These are the great characteristics of the Yosemite throughout its whole length, but besides these there are many other striking peculiarities, and features both of sublimity and beauty, which can hardly be surpassed, if equalled, by those of any mountain-valley in the world. The domes or the waterfalls of the Yosemite, or any single one of them even, would be sufficient in any European country to attract travellers from far and wide in all directions. Waterfalls in the vicinity of the Yosemite, surpassing in beauty many of those best known and most visited in Europe, are actually left entirely unnoticed by travellers because there are so many other objects of interest."

The objects of interest in this valley, which render it without a rival in scenic effects in the known world, are—first, the great cliffs and crags which border it, rising three to four thousand feet in vertical height above its level; second, the wonderful bas-reliefs of columns, spires, and arches upon its granite walls; and, third, the grand and beautiful waterfalls by which the many tributaries to the Merced enter the valley, leaping over its walls from great heights. These deserve a more particular mention. Chief among them is the Yosemite Fall. This has a total height of twenty-six hundred feet, the upper fifteen hundred of which are in a clear leap from the top of the cliff. Then follows a succession of cascades of six or seven hundred feet, below which the stream makes a second fall to the bottom of the valley. The Bridal Veil Fall, though carrying much less water, is very beautiful. In its leap of six hundred and thirty feet the column of water is swayed hither and thither by the wind, and nearly dissolved into spray, which makes its fanciful name by no means inappropriate. Other notable falls are the Vernal, four hundred feet, and the Nevada, six hundred feet, in height.

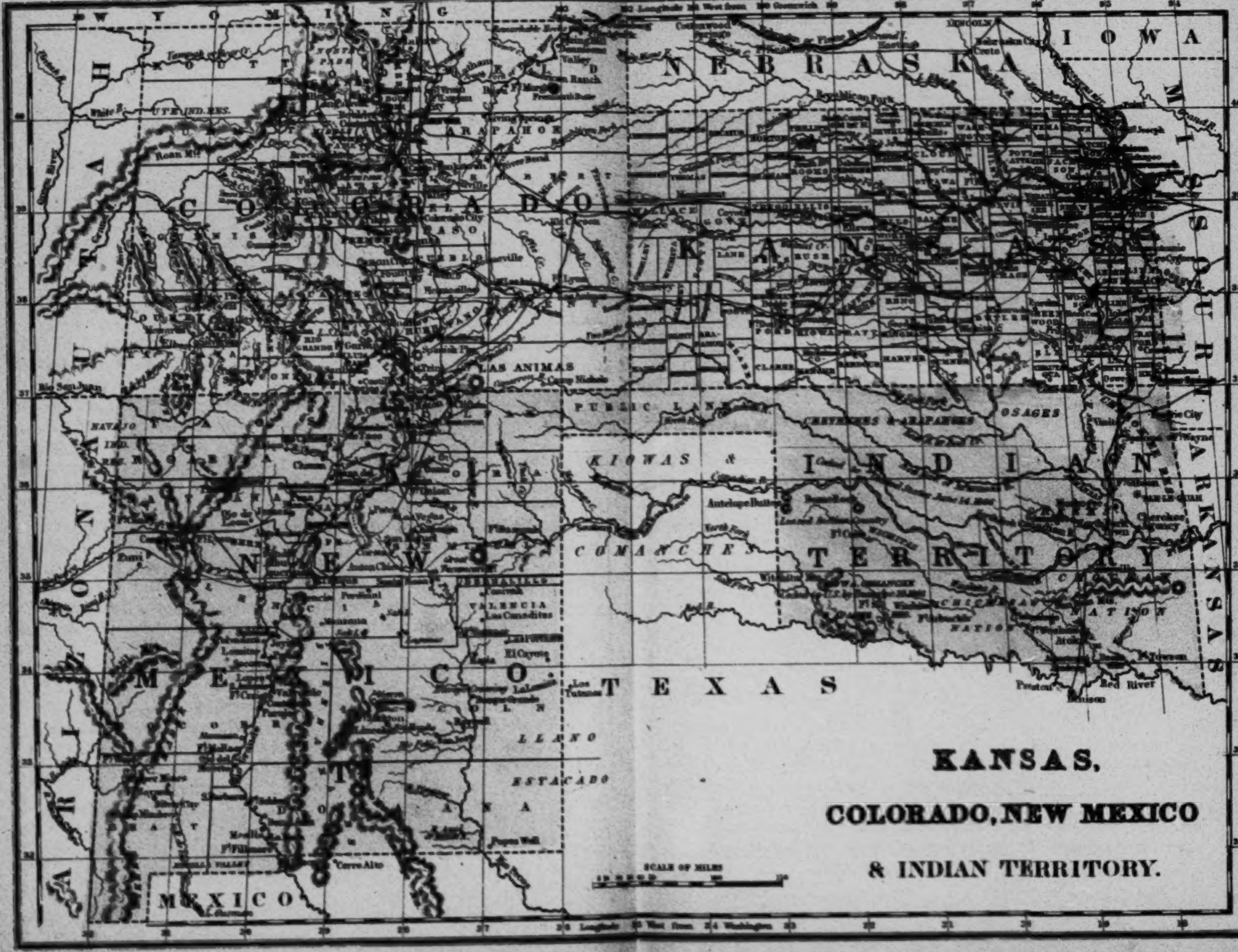
FEATURES OF THE TWO MOUNTAIN-SYSTEMS.

So far as structure and topography are concerned, the great mountain-systems extending along the western borders of the Western hemisphere from the Arctic Ocean to Patagonia may be regarded as a unit and due to one great cause. So far as we know at the present time, the general geological features are very similar, so that the application of a single comprehensive name to both groups as one grand system may not be deemed inappropriate. It may be said, then, that as North America has its lofty North Cordilleras group opposite the deep North Pacific Ocean, and its small Appalachian group opposite the shallower North Atlantic, so South America has its still higher Andes or Southern Cordilleras group opposite the deeper South Pacific, and the smaller Brazilian ranges opposite the South Atlantic. This generalization, as stated by Dana, is founded on a deep-seated structural cause. The elevation of a portion of the earth's crust requires in close proximity a corresponding depression.

The great mountain-system of the Western United States may be primarily divided into two principal portions—the Sierra Nevada and Coast ranges, fronting the Pacific Ocean, and the Rocky chain, which forms the great water-divide of the continent. Each of these chains or groups is made up of a great number of smaller ranges, in the aggregate apparently possessing a considerable degree of regularity, but when studied in detail showing less system. Sometimes, as in the Great Basin, the main ranges seem to lie parallel for the most part, but usually the minor ranges branch off in some special direction. More commonly, the trend is about north-east and south-west, but in some instances it is due north and south or east and west. The Wahsatch range in Utah trends nearly north and south, while the Uintah range, which seems to branch off from it, trends nearly east and west. The area west of the Mississippi may be divided into mountain and prairie or plain country. The belt of plains on the east slope averages about five hundred miles in width, and gradually rises to the base of the mountains. The mountain portion has its greatest breadth between the 36th and 41st parallels, where it varies from eight hundred to one thousand miles. In this belt are the greatest number of lofty peaks, including the highest portion of the Sierra Nevada.

Among the numerous ranges of the mountain-system of the West are many valleys and plateaus, varying from a few acres to hundreds, or even thousands, of square miles. Sometimes they are formed by erosion or by depression; many of them are ancient lake-basins. In all the great mountain-districts of the West are thousands of these openings, into which settlements have already penetrated. In the San Juan Mountains is Baker's Park, with an extensive settlement of miners, and in the surrounding mountains are some of the richest silver-mines in America. The North, Middle, and South Parks in Colorado are areas of depression, underlaid with sedimentary strata and walled in on every side by lofty mountain-ranges; they are really old lake-basins. The North Park has a comparatively level surface and an average elevation of eight thousand feet. South of this, and only separated by a rather low mountain-range, is the Middle Park, which is much larger and far more rugged; indeed, there is very little of what should be called plain country, but a succession of high ridges, many of which are of volcanic origin. The average elevation is about seven thousand five hundred feet. Still farther south, but separated by a much wider belt of mountainous district, is the South Park, which is mostly a plain with an average elevation of nine thousand feet. In these parks there is frost every month in the year. San Luis Valley, in Southern Colorado and Northern New Mexico, has an average elevation of seven to eight thousand feet. The Llano Estacado of Texas and New Mexico averages 3200 to 4700 feet above the sea-level; the Colorado Plain in Arizona, 5500 feet; Salt Lake Valley, Utah, 4200 to 4500 feet; Laramie Plains, Wyoming Territory, 7000 feet; Snake River Plain, in Idaho, 4000 to 4500 feet; Sevier Lake-Basin, Utah, 4700 feet; Humboldt River Basin (Lassen's Meadows), Nevada, 4700 feet; Carson River Basin, 3800 feet; Walker's River Basin, 4100 feet; and Mojave River Basin, California, 1100 feet.

Comparing the mountain-plateaus or basins of the Western mountain-region with some of those in the Andean region of South America, the difference of elevation is very great. The Antisana plateau of South America is 13,451 feet; the basin of Santa Fé de Bogota, 8413 feet; and the basin near Lake Titicaca, 12,853 feet. Perhaps as great an extent of plateau is comprised in the belt between the 38th and 44th parallels of latitude as in any other portion of the Cordilleran area. Through this belt the Pacific Railroad passes. From Omaha to Cheyenne the track lies nearly all the way on the most modern Tertiary formations. From Cheyenne westward the road crosses the Laramie range, the highest point, Sherman, being 8271 feet. After passing over about fifteen miles of granitic rocks it descends into the Laramie Plains. Thence to the Wahsatch Mountains in Utah no more granitic rocks are met with, only Cretaceous or Tertiary. In crossing the water-divide at Creston, 7030 feet high, the stranger would not suspect that he was passing from the Atlantic to the Pacific slope. The railroad runs through the Wahsatch range at right angles to its trend in the channel of the Weber River, with only four miles of granitic rocks; so that from Omaha to Ogden, a distance of over one thousand miles, only about eighteen miles of metamorphic rocks are crossed. Hence the Central Pacific crosses the Salt Lake Basin, enters the Humboldt Valley, and really meets with no mountains until it reaches the Sierra Nevada, where a most formidable obstacle presents itself in a massive granite range, which, however, is crossed at an elevation of only 7042 feet.



KANSAS,

COLORADO, NEW MEXICO

& INDIAN TERRITORY.

MINERAL DEPOSITS IN THE WEST.

According to Messrs. Blake and King, there are seven longitudinal zones or belts of mineral deposits in the West, following the prevailing direction of the mountain-ranges. Mr. King says: "The Pacific coast ranges upon the west carry quicksilver, tin, and chromic iron. The next belt is that of the Sierra Nevada and Oregon Cascades, which upon their west slope bear two zones, a foot-hill chain of copper-mines, and a middle line of gold-deposits. These gold-veins and the resultant placer-mines extend far into Alaska, characterized by the occurrence of gold in quartz, by a small amount of that metal which is entangled in iron sulphurets, and by occupying splits in the upturned metamorphic strata of the Jurassic age. Lying to the east of the zone, along the east base of the Sierras, and stretching southward into Mexico, is a chain of silver-mines, containing comparatively little base metal, and frequently included in volcanic rocks. Through Middle Mexico, Arizona, Middle Nevada, and Central Idaho is another line of silver-mines, mineralized with complicated association of the base metals, and more often occurring in older rocks. Through New Mexico, Utah, and Western Montana lies another zone of argentiferous galena-lodes. To the east, again, the New Mexico, Colorado, Wyoming, and Montana gold belt is an extremely well defined and continuous chain of deposits."

The yield of gold and silver for the year from July 1, 1877, to July 1, 1878, in the several States and Territories, is given by the Director of the United States Mint as follows:

	Gold.	Silver.	Total.
California	$15,260,676	$2,373,389	$17,634,068
Nevada	19,546,513	28,130,350	47,676,863
Montana	2,260,511	1,669,635	3,930,146
Idaho	1,150,000	2,200,000	1,350,000
Utah	382,000	5,208,000	5,600,000
Arizona	500,000	3,000,000	3,500,000
New Mexico	175,000	500,000	675,000
Oregon	1,000,000	100,000	1,100,000
Washington	300,000	25,000	325,000
Dakota	3,000,000	none.	3,000,000
Colorado	3,366,404	5,394,940	8,761,344
	$46,941,104	$48,601,314	$93,552,421

The development of the gold- and silver-mines in Colorado and the Black Hills of Dakota has been wonderful in extent, the details of which are too extended for this article.

It has usually been understood that there is no coal in the true Coal-measures west of the 100th meridian, but of late years a few thin seams of no practical importance have been reported as occurring in the south and south-west. In Colorado, Wyoming, Utah, Montana, and New Mexico vast areas are underlaid by thick beds of coal belonging to the Cretaceous and Tertiary groups. In Southern Colorado, New Mexico, and in the interior of Utah thick and important beds of coal are found in the Cretaceous group, while along the east slope of the Rocky chain in Colorado, as at Raton Hills, Cañon City, Colorado Springs, Golden City, and northward, are numerous coal-beds belonging to the Post-Cretaceous group, which are now wrought to a large extent. In the north-west the coal-area covers not far from one hundred thousand square miles. Along the Union Pacific Railroad are coal-fields of the same age, without which the railroad would be of no practical value. Not less than twenty thousand tons a month are mined at Evanston, Rock Springs, and Carbon in Wyoming Territory for the use of this road alone. From Coalville, Utah, no remarkable beds of coal are found along the immediate vicinity of the Pacific Railroad to San Francisco.

The scarcity of tree vegetation over the greater portion of our Western country renders this coal of vital importance to the present and future industries of the great West. To show the extent to which this brown coal is already employed in the industries in some of the Western States and Territories, we may cite the following reliable statistics: In the year 1877 there were mined or used in California 600,000 tons; Oregon, 200,000; Washington Territory, 150,000; Colorado, 300,000; Wyoming, 100,000; Utah, 45,000. I do not know the exact amount for 1879–80, but do not doubt that it has more than doubled that of 1877. From the *Mining and Scientific Press* for February, 1880, I take the following statistics of the coal-trade at Seattle, Washington Territory, alone. The greater portion of this coal is transported to the port of San Francisco. In 1871, 4918 tons; 1872, 14,830; 1872, 13,572; 1874, 9027; 1875, 70,157; 1876, 112,734; 1877, 104,556; 1878, 128,582; 1879, 132,264 tons; total, 590,639 tons. Although the trade in this lignitic or brown coal has sprung up within a few years, brought about largely by the extension of the system of railroads throughout the West, it is becoming extremely important year by year, and the absence of timber over so large a proportion of the Western country renders its existence a vital element of its settlement as well as its prosperity.

FOSSILS IN THE LAKE-BASINS.

The true brown-coal formations of the West form, as it were, the foundation, as well as a part, of the remarkable old estuaries or lake-basins that are found in every State and Territory west of the Mississippi. The thickest beds occur in a series of strata that seem to form a transition series from purely marine beds to purely fresh-water strata. We have already, in a preceding portion of this article, described the wonderful lake-basins in the vicinity of the Black Hills of Dakota, from the sediment at the bottom of which have been obtained the remains of a great variety of extinct animals, including camels, rhinoceroses, elephants, mammoths, turtles, birds, etc. In the Sweetwater Valley, near the Three Forks of the Missouri, in Oregon, California, Texas, New Mexico, and in Colorado, are similar lake-basins, filled with the remains of these extinct animals. On the Laramie Plains, about Fort Bridger and far south on Green River, are lake-basins of older date, referred to the Lower Miocene or Upper Eocene, in the deposits of which have been discovered the abundant remains of hundreds of extinct forms of vertebrate animals entirely distinct from those just mentioned, as of more recent age. The energetic explorations of Professor Cope within the past few years in all these remarkable localities have resulted in making known to the public hundreds of species of the most wonderful animal forms, a history of which he is now preparing for publication by the United States government. Great quantities of fossil insects, fishes, and plants are found in these older lake-beds. In the South Park of Colorado and in the Green River group of Wyoming over a thousand species of fossil insects have been found, representing almost all the families of that class of life. These fossil insects are now in the hands of Mr. S. H. Scudder of Cambridge, Massachusetts, the best American authority on this subject, and the final results of his studies will appear in a large quarto volume—vol. xiii. of the final *Reports of the U. S. Geological Survey of the Territories.* A couple of paragraphs which appeared in the *American Naturalist* in February, 1868, from the pen of Mr. Scudder, describing a small collection of these fossil insects from Green River, may be quoted here with interest:

"The masses of rock were crowded with remains of insects and leaves of deciduous trees. Between sixty and seventy species of insects were brought home, representing nearly all the different orders; about two-thirds of the species were flies—some of them the perfect insect, others the maggot-like larva, but in no instance did the imago and larva of the same insect occur. The greater part of the beetles were quite small. There were three or four kinds of *Homeoptera* (allied to the treehoppers), ants of two different genera, and a poorly-preserved moth. Perhaps a minute *Thrips*, belonging to a group which has never been found fossil in any part of the world, is of the greatest interest.

"At the present day these tiny and almost microscopic insects live among the petals of flowers, and one species is supposed by some entomologists to be injurious to the wheat; others believe that they congregate in the wheat as well as in the flowers in the hope of finding food in the still smaller and more helpless insects which are found there. It is astonishing that an insect so delicate and insignificant in size can be so perfectly preserved in these stones; in the best specimens the body is crushed and displaced, yet the wings remain uninjured, and every hair of their broad but microscopic fringe can be counted."

Over five hundred species of extinct forms of plants have been found, mostly in connection with the coal, indicating that at a comparatively modern period, geologically speaking, this great region, occupied with mountains and barren plains, was covered with forests as luxuriant as those of the Gulf States. These plants belong mostly to the early Tertiary period. Not unfrequently strata several feet in thickness occur, composed almost entirely of leaves of the fig, sycamore, willow, poplar, walnut, oak, etc., so well preserved that they seem to have fallen from their branches only yesterday. Even the delicate veins and serrated edges are as perfect as if pressed in an herbarium. Groves of palms waved their broad leaves over the ground, some of which had a spread of twelve feet. At the present time the true fan-palms are found only within the tropics. Many of the native ornamental trees and shrubs are the lineal descendants of the Tertiary species, and so nearly resemble the ancient forms that it is difficult to distinguish them. Professor Lesquereux says that among the genera found to be indigenous to our continent are the Virginia creeper (*Ampelopsis*) and the mulberry (*Morus*). Both the fossil species are in intimate affinity with the living ones. "They are seen everywhere and known and liked by everybody. The one is the friend of the farmer by its shade—of his children, delighted by the pleasantness of its fruits; the other adorns our dwellings when allowed to grow in our gardens, and when left to its own work it covers with green foliage the dead trees and the barren rocks, tempering desolation and ruin by hiding them under elegant fringes and garlands painted by the richest colors. It is worth something to know that the origin of the Virginia creeper and of the red mulberry is traceable to the Tertiary formations of North America." The gigantic *Sequoias* of California have their ancestors in several species.

The present scarcity of timber or forests in the Western or central portions of the continent at the present time is well known, and the question arises as to the climatic conditions which should have produced so marked a change from the luxuriant and sub-tropical vegetation of the modern Tertiary epoch in this region to present scarcity or almost entire absence over large areas. We now know that the principal winds come from the west and north-west, and as they pass over the summits of the different ranges of mountains from the Pacific coast eastward, laden with moisture, discharge a portion of it from summit to summit, until on the eastern slope the air is almost dry. The absence of timber is due to the absence of moisture, and the inference from the fact of the dense forests existing in the present mountainous districts of the West during the early Tertiary period is that these high summits did not then exist.

For the purpose of showing the average annual rainfall in inches in the different drainage-areas of the West we will state these briefly here. They are all well marked out. The Missouri River and its great branches, the Yellowstone and Platte, have their sources in the main Rocky range, and, gathering their waters from myriads of branches, flow at first east across the dry plains, and gradually turn south-east and join the Mississippi; the average rainfall in the Upper Missouri drainage is eighteen inches. The second drainage is that of the Arkansas, farther south, which rises in the Sawatch and Park ranges of Colorado, flows south to latitude 38° 30′ and longitude 106°, then bends east and flows across the plains to unite with the Mississippi; the average rainfall is twenty-eight inches. The third system of drainage is still farther south, that of the Rio Grande, which rises in the San Juan Mountains of Southern Colorado, flows south through New Mexico and between Texas and Mexico, and empties into the Gulf of Mexico; average rainfall, sixteen inches. West of the last is the drainage of the Colorado of the West, which, rising far north (in its branches, the Green and Grand Rivers), near the Yellowstone National Park, flows south and south-west across Wyoming, Utah, and Arizona, and empties into the Gulf of California; the average annual rainfall in this vast area is only fifteen inches. North and west of the Colorado drainage is the great interior basin, between the Wahsatch Mountains and the Sierra Nevada, with no known outlet, the great rivers sinking; here the average annual rainfall is only twelve inches. To the north is the great drainage of the Columbia, the branches of which rise in the main chain of the Rocky Mountains, far to the east in Idaho; the average annual rainfall is only eighteen inches. There are several smaller areas of drainage on the Pacific coast. The limited rainfall in all these drainage-areas mentioned shows that successful agriculture is only possible with the aid of irrigation. East of the Sierra Nevada the rains are not frequent, the snows are very light, and the amount not great, so that the supply of water from the melting of the snows is not extensive. The difference between high and low water-mark in the streams is very great. For a short time in May and June the streams are high and large, but they soon dwindle greatly, and even disappear altogether. So little snow falls on the eastern ranges that the streams which flow into the plains from the east slope will not supply water to irrigate all the fertile land that is available for agricultural purposes, and the deficiency must yet be supplied by the use of artesian wells.

The timber-line, or highest limit of tree vegetation, does not vary much in the main mountain-masses of the West. In Colorado and Utah it is from 11,000 to 12,000 feet; in Northern Wyoming and Montana, from 8000 to 11,000 feet; on Mount Shasta, California, 8000 feet; while as far south as San Francisco Mountain, Arizona, between latitude 35° and 36°, it is 11,547 feet. According to observations made up to this time, the timber-line is lower to the far North. Between latitude 45° and 46°, in Montana, it varies from 8800 to 9600 feet, while from latitude 40° to 35° it is quite uniformly from 11,000 to 12,000 feet. These statements may be regarded as approximately accurate, though more observations ought to be made.

The mean elevation along several parallels of latitude has been ascertained approximately. For instance, along the 32d parallel, between longitude 95° and 96°, the mean elevation is 500 feet; the highest mean between 108° and 110° in the Sierra Madre plateau is 5000 feet; 35th parallel, first mean, 650 feet, highest mean, between longitude 107° and 109°, at Zuni Mountains, 7000 feet; 39th parallel, first mean, 1000 feet, highest mean, between longitude 105° and 107°, in the Colorado, Sawatch, and Elk ranges, 11,000 feet; 41st parallel, first mean, 1000 feet, highest mean, between longitude 105° and 107°, Laramie range and South Park, 8000; 45th parallel, first mean, 1000 feet, highest mean, between longitude 108° and 110°, Big Horn Mountains and Yellowstone range, 7000 feet; 48th parallel, first mean, 1500 feet, highest mean, between longitude 113° and 114°, the main mountain chain, 4000 feet. The mean elevation of Arizona is 4200 feet; of California, 2800; of Colorado, 6600; of Idaho, 3800; of Montana, 3950; of Nevada, 4900; of New Mexico, 5400; of Oregon, 2700; of Washington Territory, 1800; of Wyoming, 6450.

STOCK-RAISING.

I have not spoken of what may form one of the most important industries in the West, and one which is now assuming most formidable proportions; and that is stock-raising. The great Plains form one great cattle-range. From Texas to Montana we find them dotted over with the huts of the ranchmen and covered with herds of cattle. They follow closely the retreating steps of the buffalo. So in the great valleys of Montana, the great valleys of California, and those of Oregon—indeed, wherever grass grows and hostile Indians are not too plentiful, there we find herds of cattle. Some of the cattle-men are very wealthy, numbering their cattle by the hundreds of thousands. Next to the gold- and silver-mines, no industry adds more to the wealth of the country than this. The demand for the foreign market has been very great, and over two million pounds of meat per month have been transported to Europe.

We have touched upon but a few of the topics of interest in regard to our great West, either scientific or practical, but we trust we have said enough to convey at least a glimpse of its almost unlimited future.

THE TRIP OVERLAND.

BY CHARLES RAYMOND.

STARTING out from Omaha, a prosperous city of twenty-one thousand inhabitants, situated upon the west bank of the Missouri, we set "sail" for the Far West.

Nothing can be more delightful than a journey in a Pullman car on the Pacific Railroad. The rate of speed in the East, of forty miles an hour, renders travel tiresome, but on the Pacific road the uniform rate of twenty miles an hour, with the smoothness of the track, makes the journey a pleasure.

The Platte Valley opens before our view. We follow the old trail, and enter the bottom-lands as rich as Egypt. Here Lewis and Clarke started out on their long journey overland in 1804. Millions of butterflies, those winged flowers, met their gaze, and they christened the spot Papilion. The name remains, but the men have gone. The Platte River is over three-quarters of a mile wide, with an average depth of six inches, in which the old emigrants, as one told the writer, dared not halt or tarry in the crossing, for fear of sinking so deep in the treacherous sand as not to be extricated. The rapid settlement of this valley by a thrifty and industrious class of people makes the wilderness to blossom as a rose, and the thrifty towns springing up all along the line of the Central Pacific Railroad give token of prosperity.

Oftentimes at night can be seen the prairie-fires so dreaded by the emigrant, yet so grand when seen from the car-window as they sweep over the plains.

THE PLAINS,

which extend through Nebraska, are familiar to all persons who made the journey or read of the travels of emigrants in early days. We pass the old emigrant road, "a trail drawn across the continent, like the tremulous writing of a death-warrant when Mercy holds the pen," and

DONNER LAKE, FROM THE SNOW-SHEDS.

we can but compare the present mode of travelling with former days. The contrast is marked. Nearly all the stations passed on the road have the same characteristics. They are of rapid growth, and have a population varying from several thousand to a score or less. Between them may occasionally be seen the prairie-dog villages and herds of antelope. Buffaloes have disappeared. The traveller rejoices when the first sight of the Rocky Mountains appears. Some people imagine that the mountains are almost perpendicular, and are surprised to find themselves at an altitude of 6041 feet when they reach Cheyenne, having ascended imperceptibly to that height, as the altitude above sea-level at Omaha was only 966 feet.

Cheyenne is known as the "Magic City of the Plain," from its rapid growth. In July, 1867, there was one house here; six months later there were three thousand houses. The mountains form a massive background. At present the city is prosperous, with a population of seven thousand.

From Cheyenne the tourist can make the *détour* of Colorado, and no finer scenery can be found, while the wonderful development of the minerals and other material resources of the State offers strong inducements to the emigrants.

Leaving Cheyenne, we pass through many snow-sheds, and soon reach Sherman, the highest point on the road, at an altitude of 8242 feet, and at a distance of 549 miles from Omaha. The ascent has been so gradual that the height can hardly be realized. From here the scenery is amazingly strange. Odd and fantastic shapes crowd the landscape on both sides of the track. The scenery is now very much changed. We pass Laramie City, a thriving place of three thousand inhabitants, 572 miles from Omaha. From here the traveller will gain new ideas of the sublimity of Nature in the scenery of the Rocky Mountains.

The train West-bound leaves here in the evening. The Green River country, through which we pass the following day, is marked by a most peculiar formation. The rocks are so worn by the elements as to resemble the ruins of some deserted temples or castles. Many beautiful impressions of fish and insects are found preserved in the sandstone.

ECHO AND WEBER CAÑONS

are perhaps the most far-famed of all the scenery on the Union Pacific, and crowded into a distance of sixty miles, hardly three hours' ride, we catch a glimpse of the wonderful in Nature that has not been revealed elsewhere. B. F. Taylor, in his admirable work, *Between the Gates*, thus describes it:

"The train seems hopelessly bewildered. It makes for a mountain-wall eight hundred feet high, just doubles it by a hand-breadth, sweeps around a curve, plunges into a gorge that is so narrow you think it must strangle itself if it swallows the train; red rocks everywhere huge as great thunder-clouds touched by the sun, and big enough for the kernel of such a baby planet as Mars; monuments graven by the winds; terraces along whose mighty steps the sun goes up to bed, the glow of his crimson sandal on the topmost stair; and it is twilight in the valley and midnight in the gorge. It is a fearful nightmare of stone giants, weird witches in gray groups, whispering together in the hollow winds, of the mountains—witches' baths for high revels; Egyptian tombs; fortresses that can never be stormed. Yonder, a thousand years ago, they were launching a ship six hundred feet high in the air, but it holds fast to the 'ways' still. Its stately red bow carries a cedar at the fore for a flag. It is a craft without an admiral. Some day an earthquake out of business will turn shipwright, put a shoulder to the hull, and Leviathan will be seen no more." But you are soon in the valley of the Weber River, and the cultivated fields, in contrast with the rugged scenery, appear as fair as the Garden of the Lord.

Ogden, which is the junction of the Central Pacific and Union Pacific, is also the point where the transfer is made to visit Salt Lake City, made notorious as the home of the Mormons. A few days spent here can be most interestingly employed. The various attractions of the city, as Temple, Tabernacle, co-operative store, can all be seen in a day or two, and the journey resumed westward.

The magnitude of undertaking the building of a railroad through this country is more and more impressed upon the mind, and it may be well to consider briefly the construction of the Union Pacific and Central Pacific Railroads.

THE UNION PACIFIC

was chartered in 1862, yet the grading was not done until 1864, and the first rail was laid in 1865. At that time there was no railroad communication from the East, and a gap of one hundred and forty miles existed between Omaha and Des Moines. For five hundred miles westward from the Missouri River the country was completely destitute of timber, and ties were transported from six different States and Territories, at a cost often of two dollars and a half per tie—thus can be seen the difficulties encountered at the outset—yet so vigorously was the work prosecuted that in three years six months and ten days the road was completed.

THE CENTRAL PACIFIC.

But while the plains of Nebraska were filled with the army of workmen, the Sierra Nevadas were teeming with laborers on the Central Pacific.

Though the Central Pacific was begun in 1860, several years sooner than the Union, yet the difficulties encountered were so much greater that the construction was not consummated so quickly as in the case of that road. The rails, cars, locomotives, all had to be transported around the Horn, and at one time there were thirty vessels *en route* from New York with supplies for the Central Pacific. The most serious difficulty was the Sierra Nevadas, but by tunnelling and blasting the way was forced through. More powder was expended in the effort than was needed to fight half the battles of the Revolution.

In April of 1869 ten miles of the road were built in one day. This is probably the greatest feat of railroad-building on record. What is more remarkable about it is, that eight men handled all the iron on this ten miles. These eight giants walked ten miles that day, and lifted and handled one thousand tons of rail each. On May 10, 1869, the two roads clasped hands at Promontory Point, and a railroad from Omaha to San Francisco, a distance of 2221 miles, was built in less than five years. Columbus, sent out by Ferdinand and Isabella to discover the Indies, was halted by a continent; that continent is now spanned by a railroad. May not imagination picture the form of Columbus standing upon the summit of the Rocky Mountains, with a scroll in his hand, pointing to the setting sun, saying, "There is India; there is the East"?

TO THE SIERRAS.

The trip through the desert in Central Nevada is very monotonous. Sahara itself could not surpass the landscape in woe-begone infertility. This is the dreariest day of the overland trip, and should it be in summer the traveller will find the dust very disagreeable. But the Sierra Nevadas, when reached, are appreciated more fully, however, for the ride of the past day. When evening comes the outlook is desolate and barren, but when the curtain of night is lifted we are in the very heart of the Sierras, upon which the snow falls to a depth of thirty feet, and often the traveller finds himself in winter when the lowlands are hot in August.

At Reno the change of cars is made to visit Virginia City, the famous mining camp of the Pacific coast. Near here is Lake Tahoe, one of the finest sheets of water on the continent, and far-famed as a pleasure resort.

Near Truckee the road passes Donner Lake, where a party of emigrants in 1846 were overtaken by a severe snowstorm, and were compelled to spend the winter. Many perished, and dark tales are told of cannibalism. No one can think of this tragedy without a shudder. In crossing the Sierras the most famous scenery is at Cape Horn, where you peer down a cañon half a mile below. The scenery through this region is grand beyond description, while a peculiar blue haze adds a charm to the landscape.

We soon enter the warm lowlands, and reach the capital of the State, Sacramento. The population is about twenty-five thousand. The State Capitol building, a magnificent structure, is the most attractive object to visitors. To San Francisco, the Athens of the Occident, the distance is but one hundred and thirty-eight miles. The overland train first reaches Oakland, a most beautiful city of forty thousand inhabitants, and bearing the same relation to San Francisco that Brooklyn does to New York.

Leaving the cars, you enter a splendid ferry-boat and cross the Bay of San Francisco, one of the finest natural harbors in the world.

SAN FRANCISCO,

a city with a growth of only twenty-seven years, contains over three hundred thousand inhabitants and covers a territory of forty-two square miles. It is a city of boarding-houses; not less than fifty thousand people eat at restaurants, and thirty thousand more at the ninety hotels and eight hundred lodging-houses.

The city is celebrated for its hotels. The Palace ranks first, while the Baldwin, Grand, Lick, Occidental, Russ, are among the most prominent.

The commerce of the city is very extensive, while ships from all quarters of the globe can be seen in its harbor. The Chinese quarter contains many attractions for the visitor, and will well repay a visit.

A guide can be procured from police head-quarters, and a tour of "Chinatown" made in perfect safety. The most interesting objects to be seen are stores, shops, restaurants, and temples (or joss-houses), and opium-dens. The stores are open late at night, and on Sundays as well, and are found in one quarter crowded together. The temples or joss-houses, where they worship their gods or graven images, are open to the public, but the visitor will find the light that constantly burns within to be dim, though not religious. The various gods or images are placed in alcoves, while before them are offerings of food by their worshippers. Some of these temples are very gaudily and expensively ornamented. The theatres are a curiosity. They have no curtain, and when the play ends the victims in the play are dragged from the platform, or even if the hero is killed in the play, he may get up and leisurely walk away. The orchestra sits upon the stage and discourses music during the entire performance, but "horrible" is the word that best describes it. The acrobatic performances are really creditable, though a short stay generally satisfies the visitor. The opium-dens can be visited, and this debasing vice be seen as practised by the "heathen Chinee."

Woodward's Garden, a combination of museum, menagerie, theatre, aquarium, and botanic garden, has become a favorite pleasure resort. The traveller should drive to the Cliff House, where the seals may be seen disporting upon the rocks and a splendid view of the Pacific Ocean can be obtained.

There are two systems of streets, Market street being the dividing-line. The wholesale business of the city is done along the water-front and north of Market street; retail business of all kinds is found in Kearney, Montgomery, Third, and Fourth streets. One noticeable feature is the number of bay-windows in the houses. So numerous are they that San Francisco has been aptly called the "Bay-Window City." The palatial residences of the railroad magnates and "bonanza" kings on Knob Hill are an ornament to the city.

The climate of San Francisco is very peculiar. The coldest month is July, when furs and overcoats are in demand. The seasons are not divided as in the East, but into wet and dry. The winter is usually rainy, beginning about October and lasting until May, and it is dry during summer.

The mornings in San Francisco are usually warm and bright, but the sea-breeze from the ocean, which springs up about 3 P. M., makes the afternoons and evenings chilly. However, on the opposite side of the bay, at Oakland, and in many suburban nooks where the sea-breeze does not reach, the climate is uniform and delightful.

There are very many interesting excursions from San Francisco which can easily be made. The trip to the Geysers will occupy but a few days. Leaving San Francisco in the morning early, you will reach the Geysers late in the evening of the same day. The distance is about one hundred miles north, and will include a ride by steamboat, cars, and stage. The best time to see the Geysers is in the early morning, before the sun has drunk up the vapors. The ground literally boils and bubbles under foot. The steam issues from many holes in the earth, but they are not spouting springs, so that a person should not go with Icelandic pictures in his or her mind, expecting to see anything like them; but a cañon filled with vapor and steam boiling and bubbling, surrounded by the wild scenery of the mountains, makes the scene strange and weird. The trip can be made *viâ* St. Helena and return by Calestoga, near where the Petrified Forest can also be seen. The cost of the trip is about sixteen dollars for fare, and time three days.

Another pleasant excursion from San Francisco is the trip to San José (pronounced *San Ho-zay*), fifty miles south—one of the loveliest inland cities in California, with a population of twenty thousand. From here the distance is short to Monterey, the old capital of the State.

But the trip to Yosemite Valley and Big Trees surpasses any other, and is called "*the* excursion" in California, and you have not seen the wonder of the Pacific coast till you have made this trip. The distance is about two hundred and forty miles, and the train leaves at 4 P. M. There are four different routes, any one of which is very good. The one to Mederia may be mentioned as an example. The train arriving in the evening, the traveller can enjoy a good night's rest, and then have an early start by stage for the valley. This occupies two days, arriving in the afternoon of the second day. The Big Trees can be seen *en route* or else on the return trip. They are so large that at first one does not appreciate their magnitude, and when their great age is contemplated it gives one a queer feeling to look at a tree that may have been waving its green branches high in the air before Julius Cæsar landed on the shores of Great Britain.

Yosemite Valley, the "Mecca of the Beautiful," will awaken new visions of beauty that cannot be seen elsewhere; but as the famous resort has been so admirably described elsewhere in this work, a description will not be attempted here. The cost of the trip for fare is sixty dollars, and the time from San Francisco is a week to ten days.

SOUTHERN CALIFORNIA AND ARIZONA

have been lately opened to public travel by the building of the Southern Pacific Railroad, which now extends from San Francisco to Central Arizona, and is being rapidly pushed forward, and will soon make a Southern Transcontinental route. The scenery along this highway is varied, as the road passes through a desert; and, what is remarkable, in the Tihachapi Pass, where it crosses a range of mountains, it forms a loop and recrosses itself, one portion of the track being far above the other. This is probably one of the most difficult feats of engineering in the world.

Los Angeles, the metropolis of Southern California, contains about sixteen thousand inhabitants, and is situated four hundred and seventy miles south from San Francisco. Here oranges grow in perfection, and all the semi-tropical fruits flourish in abundance. This city will furnish a pleasant sojourn for the traveller.

Arizona, which has so long been barred to the travelling public by the difficulty of access to it, is now being penetrated by several lines of railroads, and this unknown part of our country will be more fully explored and settled in the next few years, as the recent valuable mineral developments are attracting great attention. This State can be reached by rail from Los Angeles, and offers many points of interest to the traveller.

THE TRIP TO OREGON

can be taken by the Oregon Steamship Company's steamers, which ply regularly between San Francisco and Portland, sailing every five days. The trip occupies two to three days, as the distance is over seven hundred miles, but not two days on the ocean, as the Columbia River furnishes over one hundred miles of the voyage before reaching Portland. This is the route most patronized, and does the bulk of the business, but should the traveller prefer it the trip can be made *viâ* Sacramento by railroad to Redding, and then two hundred and seventy-five miles of stage, which goes through some of the finest of scenery, passing Mount Shasta, the famous mountain of Northern California, to Roseburg, and thence two hundred miles by rail to Portland, the metropolis of the Northwest. This city of twenty thousand inhabitants does more business for its size than any in the United States.

The scenery of Oregon and of Washington Territory is among the finest in the world. The river-steamers on the Columbia are fitted up very handsomely, and a sail up the river will be found exceedingly enjoyable. The Cascades contain some wild and grand scenery. Here a transfer for a short distance must be made by rail, and then another steamer taken. Should the excursion extend to Wallula (or Walla Walla), the scenery will be found magnificent, and if it should be in harvest, when the immense shipments of wheat are made, the traveller will be amazed at the resources of this inland empire.

The tide of emigration is tending strongly to Eastern Washington and Oregon, where the vast extent of lands adapted to wheat-raising is rapidly being occupied. This undoubtedly is one of the finest wheat-producing sections of the entire country, and railroads are being rapidly constructed toward this portion of the land, when in a few years several outlets will be given to the immense supply of surplus products.

From Portland a trip can be made to Puget Sound, one of the finest sheets of water on the continent, and which has been well named the "Mediterranean of America." Seattle, which is the largest town on the Sound, does an extensive coal-shipping business. From here the trip can easily be extended to Victoria in British Columbia, which is a beautiful place of five thousand people. In this section the scenery is very striking and grand. The opinion is prevalent that a trip to Alaska is very disagreeable and unpleasant, whereas, on the contrary, it is one of the most delightful of summer ocean-voyages. The regular steamer "California" starts from Portland the first of each month, and touches at Victoria, B. C., on the way to Sitka. This part of the voyage is in open sea, but the tourist can cross the Sound and meet the steamer at Victoria, when the continuation of the voyage is as delightful as river-sailing. The inland passage, as it is called, lies between the islands and mainland nearly the entire distance, and mountain-peaks rising to great heights on either side often very near to the vessel, while waterfalls and cascades add new beauty to the scene, present a panorama of the beautiful in Nature for nearly a thousand miles, unequalled perhaps in the world save in the open sea of Japan.

The town of Fort Wrangell, at the mouth of the Stickeen River, is the trading-post for this region and the supply-station for the Stickeen mines. While the ocean-steamer is landing and discharging cargo, if the traveller could arrange with one of the river-steamers to ascend the Stickeen River and see the immense glacier, one of the largest in the world, he will be amazed and delighted with the scenery of the trip. The voyage to Sitka, where many curious specimens of Indian carvings can be obtained, will occupy a few days longer, and the entire round trip from Portland but two to three weeks.

It is impossible to fully describe the beauty of this voyage. The water is so smooth, the land constantly in sight, the traveller can hardly believe he is on the ocean. Suffice it to say that for a summer trip of a few weeks the voyage to Alaska cannot be surpassed, and all on board the California in August, 1879, will agree with the writer in this assertion.

TO THE WEST! TO THE WEST!

BY CHARLES MACKAY.

To the West! to the West! to the land of the free,
Where mighty Missouri rolls down to the sea;
Where a man is a man if he's willing to toil,
And the humblest may gather the fruits of the soil;
Where children are blessings, and he who hath most
Hath aid for his fortune and riches to boast;
Where the young may exult, and the aged may rest,—
Away, far away, to the land of the West!

To the West! to the West! where the rivers that flow
Run thousands of miles, spreading out as they go;
Where the green waving forests that echo our call
Are wide as old England, and free to us all;
Where the prairies, like seas where the billows have rolled,
Are broad as the kingdoms and empires of old;
And the lakes are like oceans in storm or in rest,—
Away, far away, to the land of the West!

To the West! to the West! There is wealth to be won;
The forest to clear is the work to be done;
We'll try it, we'll do it, and never despair
While there is light in the sunshine and breath in the air.
The bold independence that labor shall buy
Shall strengthen our hands and forbid us to sigh.
Away, far away! Let us hope for the best,
And build up new homes in the land of the West!

CLEAR CREEK CAÑON, COLORADO.

to Mexico, returning with a record of disappointment that resulted in an abandonment of all effort in that direction.

Up to the year 1600 the territory comprised within the present limits of Colorado was supposed to belong to Spain, but in that year France claimed possession. During the seventeenth century at least three expeditions were sent into these vast and unknown regions. In 1769 the province was ceded to Spain by France, but in 1800 the French regained control, keeping it until 1803, when by treaty and purchase the United States became the owner of the province, and took prompt measures to establish its authority and government in due form over the country.

In 1806, Major Pike, by authority of the War Department, with a party of twenty-three men traversed the entire extent of Colorado, north and south, without finding a single settlement of civilized beings; only the wild savages roamed over the land. In 1819, Colonel Long's expedition entered the country, following up the South Platte River to where it escapes from the cañon. A careful examination was made of some of the mountains and of the plains from the South Platte to the Arkansas. In 1832, Captain Bonneville made a very thorough exploration of the Rocky Mountains in the interest of the American Fur Company, and is said to have been the first who proved that the head-waters of the great rivers flowing east and west had their origin nearly together in the great Sierra Madres. In 1843, Colonel Fremont commanded the next expedition sent out by the United States government. He camped some time in the St. Vrain Valley, and afterward journeyed north, reaching Fort Laramie. He found the Indians already troublesome to parties who were passing through the country on their way to California.

There is no evidence to show that there were any white settlers in Colorado previous to 1843, save trappers, traders, and employés of the American Fur Company. There was no knowledge of the treasures hidden in the soil or in the rocks at that time. The vast country was given over to the savage Pawnees, Cheyennes, Arapahoes, and Utes.

From the time of Fremont's last expedition in 1844 up to 1858 the country was under no regular form of government. The only recognized authorities were the Fur Company and the United States military, and these were confined to the limits of the posts and forts.

In 1852 came the discovery of gold by one Parks, a Cherokee cattle-trader, who, *en route* to the shores of the Golden Coast with a party of followers, discovered the precious metal on the banks of Ralston Creek. Tidings of this discovery after a long time reached Georgia, and in 1858 Russell's expedition was organized, reaching Cherry Creek in June, 1858.

In the fall Russell returned to Georgia, taking with him his precious samples and giving glowing descriptions of the country. The Pike's Peak excitement then began to spread, and palefaces, with immense trains of supplies, commenced traversing the great Plains, and disputed possession of the country with the Indians, who refused to recognize the right of the white men to occupy their vast domains. But the onward march of the Caucasian could not be stayed, and by the time the winter of 1858-59 set in settlements had been made at Auraria and other points, and at least four hundred persons were in the Territory.

In the spring of 1859, Green Russell's journal was printed by Major D. C. Oaks, with descriptions of the best routes to the new Land of Promise. This book, full of glowing descriptions of the Land of Gold, was extensively circulated throughout the Eastern States, and caused thousands to leave their homes and turn their faces westward to the land of untold treasures.

The discovery of the first gold-bearing lode was made in Gilpin county, May 6, 1859, by John H. Gregory, and ere long the gulches were full of prospectors and all the mountains in the vicinity covered by eager seekers after the shining ore. By the spring of 1860 at least twenty thousand persons were scattered over the country, and the development of the greatest mining district in the world had begun.

Silver ore was discovered as early as 1861, but not until 1864 was it actually demonstrated beyond question that there existed in this new region of mineral wealth the richest belts of silver-mines in the known world; and an impetus was then given to mining enterprises that rivalled that of California in its early days.

The necessity of local laws and the taking of steps to connect the district with some legislative body was soon apparent. A county was therefore defined and named Arapahoe, with Auraria as the county-seat; a representative sent to the Legislature of Kansas, as well as a Delegate to Congress to secure recognition and the establishment of a Territorial form of government. An organization under the name of Jefferson Territory was perfected and a provisional government formed. This body passed the act consolidating Auraria and Highland under the corporate name of Denver. Ditch and wagon-road companies soon followed, and healthy legislation prepared the way for the inauguration of a Territorial form of government. February 26, 1861, Congress passed an act, and Colorado took her place under the fostering care of the general government. In May of the same year the Territory had a population of 25,329, of whom 4484 were females. In September a Delegate to Congress was elected and took his seat. Nine counties had been organized, and a Legislature chosen by the votes of the people.

During the period of the war of the Rebellion the country did not develop as rapidly as might have been expected, although speculation was rife and very many mining companies were organized in the East, stocked at enormous figures, and placed on the market. The great majority of these came to grief, and by the year 1866 the mining-camps of Colorado wore a very discouraging appearance.

In 1864 and '65 the Plains Indians inaugurated war upon the white settlers, and during these years numberless disasters occurred. But little communication could be had with the States. Stages had to fight their way through. Wagon-trains were attacked and destroyed, and machinery of immense value was abandoned in the endeavor to reach the camps. But the gradual advances of the Union Pacific and Kansas Pacific Railways had their due effect, and the Indian fell back as the whistle of the locomotive was heard over the desolate prairies, and Civilization's finger pointed the savage to the parks and valleys on the western slope, where, by treaty, they were secured, for a time, the hunting-grounds they desired.

In 1867 the Union Pacific Railroad reached Cheyenne, and Denver was thus brought within 104 miles of direct communication with the East. In 1868 the Denver Pacific, to connect at Cheyenne with the former road, was begun, and finished in 1870; in which year also the Kansas Pacific reached Denver and the Colorado Central was constructed to Golden. From this date the prosperity of the country and the permanence of the towns already established were assured. Little attempt had as yet been made to establish any industry save mining; but the settlement of the Union Colony at Greeley in the spring of 1870 was the inauguration of a development of the agricultural resources of the country and an earnest of its stability. The success of this colonial experiment having been demonstrated, others followed in its wake—one in Wet Mountain Valley, one on the South Platte River, one in the valley of the St. Vrain, and one at the junction of the Monument and Fontaine-qui-Bouille. Towns were founded, farming settlements established, and industries of every kind prospered. In 1871 the Denver and Rio Grande Railway began to feel its way southward, reaching Colorado Springs in the fall of that year, and in a short time afterward it was extended to Pueblo.

About this time (1870) probably forty thousand people were in the Territory, but the means of communication being now rapid and assured, it was believed that a steady growth in population would follow; which was found to be true. The mines were producing largely of the precious metals, the farmers rejoiced in the possession of bountiful harvests, and the cattle upon the Plains prospered and increased rapidly, to the delight of those who had invested in stock.

In 1874–75 a second effort was made to establish a State government, and proved successful. On July 4, 1876, Colorado entered the Union as the Centennial State.

In 1876 the Atchison and Topeka Railroad reached Pueblo, giving the State a third outlet to the East. The following year the Carbonate Camp at Leadville began to attract attention from all parts of the State, and the Denver and South Park road, begun in 1874, and built to Morrison in that year, began to reach up Platte Cañon, while the Colorado Central had been extended to Georgetown, and a broad-gauge line built north to Longmont, tapping the great agricultural area of the State. The Denver and Rio Grande pushed its way over the Sangre de Christo range, and rested at Fort Garland, preparatory to reaching the shores of the Rio Grande del Norte at Alamosa. Meanwhile, during these years important geological and geographical surveys were being conducted by the United States government under the superintendence of Professor Hayden, and their reports, when published, became important factors in the development of the internal resources of the country, attracting the attention of the people of the entire Union. These reports have been of value, and have very materially aided in advancing the general prosperity of the country.

The opening of the year 1880 shows Colorado to be making rapid strides toward the front rank as a mineral-producing region, while her agricultural resources are also being permanently developed. Her climate is the admiration of invalids, her scenery the delight of tourists. She has yielded out of her bountiful bosom ten billion dollars of gold and silver since 1859. Her real estate and personal property foot up over seventy-five million dollars. She has thirty-one counties, having a population of nearly two hundred and fifty thousand. The counties in which farming and stock-raising predominate are Weld, Larimer, Boulder, Jefferson, Arapahoe, Douglas, El Paso, Fremont, and Las Animas. Those devoted almost wholly to cattle and sheep are Elbert, Bent, Pueblo, and Huerfano. The principal mining counties are Park, Lake, Gilpin, Clear Creek, Summit, Custer, Hinsdale, San Juan, and Ouray.

The growth of the cities and large towns has been proportionate with the general advance of the State, and everywhere new towns have been created by the extension of the railway system and the discovery of new mines.

CLIMATE AND HEALTH.

The climate of Colorado, to which so many are looking as a possible home, is an important topic and one to be carefully considered. A few statistics, therefore, gathered from the reports issued by the Signal Service station at Denver, will give information of value in reference to the atmospheric condition of the country during the period of one year.

The entire amount of precipitation (rain and melted snow) was 10.86 inches. This accumulated from rains and snows, which fell on sixty-one days. But two storms during the year exhibited unusual severity. The first took place May 11th, the second July 22d. There were 190 clear days, 139 fair or partly clear days, and but 35 reported cloudy. The temperature, while it exhibited some sudden changes, was not of unusual range. The highest reading, 98° above zero, occurred on July 13th; the lowest, 17° below, was on December 24th. During the year the thermometer read 95° or above but seven times. It read below zero on six days in January, one in February, and six in December—thirteen in all. The mean temperature for the year was 50°; the mean for July, the warmest month, 74°. The last frost of spring appeared April 27th, while the first frost of autumn was observed October 9th. The former was not as late as usual, nor the latter as early as in other years. Each month furnished south as the prevailing direction of the wind.

Colorado is included in the boundaries of the temperate zone. The Plains portion is within the isothermal lines that take in New York, Columbus, and Council Bluffs. The foot-hills are included in the lines that embrace Boston, Albany, Detroit, St. Paul's, and Omaha. The main range and the western half of the State show the same lines that include Halifax, Burlington, Montreal, the upper Lake Superior region, and the head-waters of the Red River of the North. But the extremes of heat and cold are not so great as at these points. The absence of any very great quantity of moisture has a wonderful effect upon the air, and Colorado is famous for its clear skies and invigorating atmosphere. The cloudy days are so few as to be considered a rarity. The average temperature of the Plains is from 50° to 55°; of the foot-hills, from 45° to 50°; of the mountains, 40° to 45°. As has been admirably summed up, "The results of the climatological conditions of Colorado are an extremely healthful and invigorating atmosphere, peculiarly beautiful and enjoyable, well adapted to all pursuits and all out-door avocations." It might be added that as a health resort Colorado is without an equal for the cure of tubercular and pulmonary affections, asthma, and dyspepsia.

Consumptives who reach the country before the disease has too greatly developed are almost certain to recover; those in whom the disease has advanced will find it possible to live for many years in comparative comfort and vigor. But it is unwise for those who have suffered for years, and in whom the insidious enemy has become deeply rooted, to seek Colorado expecting a cure. Confirmed cases are as hopeless as in the East; in fact, the end is likely to come sooner, on account of the very rarity of the air and the necessity of increased respiration. These, in the early stages, are conducive to recovery; in the later, to a speedy ending of the life of the patient.

Asthma, however, in its most aggravated form, and no matter how long seated, is relieved in every instance by a residence in Colorado. The right altitude to suit the patient's case having been found, relief is at once felt, and a perfect immunity from this distressing complaint may be relied upon as long as one remains in the country. Hence it follows that those who seek Colorado for relief from asthma must expect to make their home for life in the State. A temporary residence will not suffice, since the disease, apparently, is not eradicated. A return to the old home would carry with it a return to the old troubles in a very short time. The change of residence must be considered permanent, therefore, and those who are afflicted and would be relieved must accept this fact as one not to be questioned, and prepare their plans accordingly.

Dyspepsia is one of those distressing complaints connected with the condition of the human system which will lead the sufferer therefrom to adopt any course from which relief may be obtained. The most pleasant sugar-coated remedy we know of is to live in Colorado, thus recovering the lost powers of assimilation, and in its bright days, inducing out-of-door exercise, and its cool nights, wherein refreshing slumber is assured, find a sovereign panacea for one of the most grievous ills that flesh is heir to. Once more may food be relished and enjoyed, and hearty meals be made on substantial bread, blood-invigorating beef, tempting mountain-trout, and juicy wild meats, without the fear of an after-punishment.

Many other diseases that afflict humanity are partially eradicated or relieved by a change of residence to the altitudes of the Rocky Mountains, but it would be impossible to enumerate them all. There is an exception, however, it would be proper to name—catarrh. It is extremely doubtful if the peculiar dryness of the atmosphere is favorable to the cure of this disease. In fact, it is asserted by high authorities that

MOUNTAIN OF THE HOLY CROSS, COLORADO.

the dryness tends to aggravate many cases by forming concretions on the inflamed mucous surfaces, and so irritating them. The rainfall is so meagre, the fine dust so common, that these are causes naturally tending to further the advance, rather than retard the progress, of catarrh. There is no country yet discovered in this world that has in it the elements of cure for every ill that human flesh is unfortunately subject to. When such a country is discovered on this habitable globe, paradise will lose some of its prospective charms, and the song of "I would not live alway" be paraphrased to suit this desirable location.

SCENERY—CAÑONS OF COLORADO—POINTS OF INTEREST.

On the upper Cache-la-Poudre may be found some very wild and romantic spots. It is a point as yet but little known to tourists, though sportsmen have found that it furnishes excellent trout-fishing, with an occasional bear- or deer-hunt thrown in by way of giving variety to it. The solitude of the mighty pine forests that crowd to the very water's edge at occasional points has a calm delight in it that must be experienced to fully realize its delightful charm. Here and there beautiful parks and lovely meadows break the monotony of the forest, and offer a landscape that would tempt an artist to linger long enough to catch its beauties and pinion them upon his canvas. Secluded glens abound, suitable for cosy camping-grounds, and the murmur of the limpid waters of the Cache-la-Poudre, as they rush with precipitate haste to seek the bosom of the South Platte River, falls most musically upon the ear. A week can be pleasantly spent in this vicinity by those who like the silence of the woods for their souls and the succulent sweetness of trout for their sustenance.

Estes Park is now rapidly growing into popular favor as a summer pleasure resort, and is likely to be still better known in the future. It is easily reached by a few hours' ride from Longmont, on the Colorado branch of the Union Pacific Railway. Lying at the base of Long's Peak, the third highest mountain in the State, Estes Park is a lovely emerald area hemmed in by mountains and full of meadows and groves, with here and there a sparkling trout-brook. To "camp out" in Estes Park is the height of enjoyment for hundreds of the country-people within fifty miles of the park, and indeed city-folks and Eastern pleasure-seekers are beginning to discover that out-of-door enjoyment can here be realized to its fullest extent at a point where "the scene is replete with grassy slopes, crystalline streams that course down from the melting snow-banks, broad zones of pine forests, towering heights of mountains, and shady nooks." Such a spot as this is one for the tourist to linger in during the summer months, when numberless wild flowers burden the air with their perfume.

Boulder and its vicinity are prolific in health resorts and points of interest to visitors in search of the elixir of life and of pleasure. At Springdale, near by, it possesses a spring whose waters are a sparkling seltzer that is very efficacious for cases of scrofula and for diseases of the blood, while their location, in the immediate vicinity of a large number of valuable silver-mines, lends them an additional attraction. But Boulder Cañon is the admiration of all, for it has been very aptly described as Colorado's Yosemite. Many of the well-known places in the East, such as the Delaware Water-Gap, the point where the Potomac passes through the Blue Ridge, or even Niagara Falls, wane in grandeur before the scenery to be encountered at every step in this magnificent theatre of Nature's faultless construction. The walls stand up, at points, two thousand feet high, while below leap and sparkle the crystal waters of the stream as they hurry over the big boulders from whence the river takes its name, to leap into the arms of the St. Vrain, awaiting them on the plains below. The infinite variety of the scenery hereabout is a constant surprise; the foliage has a beauty whose refreshing charm never tires; while at the falls proper, where the water drops fifty feet from the rocky edge into a deep basin, above which the rocks tower in solemn grandeur, one can only, with hushed breath, look, linger, and admire. This cañon has not been "written up" as much as some others in the State, but it is to be said in its behalf that there are few more striking in the points of grandeur presented.

Clear Creek Cañon is one of the most sublime of Nature's handiworks, and, in addition to its natural attractions, teaches a lesson by which the ingenuity, the persistence, and the power of man are shown by utilizing even the most rugged paths and almost inaccessible points for his own purposes. The ride by rail up Clear Creek Cañon must be made by all who visit the State, or they miss one of its greatest attractions. To the sublime scenery of the hills is added the skill of the engineer, and we behold Nature and art in such happy combination as we follow the serpentine track of the narrow-gauge railway up the steep declivities of the cañon, over beds cut out of solid granite walls, over numberless bridges across the same sinuous stream, that the ride to Central City is one long period of bewildering suspense, for we do not know what we may see next, and of overwhelming wonder as surprise follows surprise fast as the shadow hides the sunshine, while we glide in and out under overhanging arches or between the rugged defiles. At times the waters of the stream touch the very rails our car is on; again they are to be seen dashing over the stones many feet below. The number of bridges is about twenty-five on this short line of railway, and the changes, now on this side, now on the other, as we glide along over a highway of short tangents and numberless curves, are enough to bewilder those who are unaccustomed to the mountain-scenery. The climbing is at the rate of one hundred and seventy-five feet to the mile, and the foliage of the pines against the sombre gray and brown of the rocks presents a constant series of ever-shifting views whose beauty is as rare as it is indescribable. We would like to give more space to the wonderful cañons for which Colorado is so remarkable, but cannot. We can only say that if you want to see Nature in all her rugged grandeur and rude sublimity, associated with skill in art, in a combination of the beautiful and the useful, you can see her in Clear Creek Cañon, and need not cross the seas to hunt for her among the mountains of Switzerland.

Platte Cañon is another wonder; and mention of its name reminds us of the saying of some one, that "the Lord didn't make Platte Cañon; it was a freak of Nature;" and we are almost inclined to agree with him, for the mountain-scenery here opened up to the tourist world by the entrance into and passage through Platte Cañon by the Denver and South Park Railway is singularly unique. Here is presented mountain-scenery that has been, on account of its comparative inaccessibility, hitherto unknown. In these wilds and fastnesses are hidden scenic beauties and natural wonders that far exceed anything yet described by tourists and engineers. Twenty miles from Denver the visitor reaches the entrance to the cañon, and from thence to the top of the pass there is a gradual ascent of from one hundred and thirty-seven to one hundred and fifty-eight feet to the mile. The curves on this road are not quite as sharp, nor the hills quite as high, as in Clear Creek Cañon, but the angry torrent is here, dashing often over solid beds of rock without sand, gravel, or boulder. Here and there are little stretches in the stream where the water glides along as smoothly and as unruffled as one's thoughts glide in a dream where love and happiness constitute the principal charm in the slumberous bliss. As one has described it, "walls of granite, rising perpendicularly to a height of five hundred feet in some places, to fifteen hundred in others, capped with columns, pyramids, domes, and grotesque figures resembling nothing, rise up on either side of the river, overhanging it and the puny track at their base in many places. Anon the sparkling waters of a cataract come dashing down the mountain-side from a

COLORADO.

BY W. B. VICKERS.

GENERAL HISTORY.

EARLY in 1541 an expedition, well armed and equipped, under command of Vasquez Coronado, a Spanish military chief, was fitted out by the viceroy of New Spain to explore the country lying to the northward, comprising what is now known as New Mexico, Arizona, and Colorado. Previous to this, however, between the years 1530 and '40, two or three partial and unsatisfactory attempts had been made to explore the country by Friar Niza and others, who had returned to Mexico with highly-colored accounts, secured from Indians, of untold wealth existing in a section termed the "Seven Cities of Cibola." Stimulated by these reports, the viceroy of New Spain was induced to organize the expedition under Coronado, and early in January, 1541, the band of explorers, consisting of about four hundred men, many of them cavaliers of distinction and of the best blood of Spain, left Compostella, a point on the coast of Mexico nearly due west from the capital, and commenced their journey. For a long time they kept near the shores of the Pacific Ocean, then made their way back into the country. On the Gila River, Coronado found thickly-populated settlements, but no evidence of great wealth. Continuing his march in a north-easterly direction, in fifteen days he reached Cibola, but, instead of the fabulous wealth that had been reported, he found a town of about two hundred inhabitants, having but little knowledge of any gold and silver treasure. These people were probably the ancestors of the present tribe of Zuni Indians. Continuing in a general north-easterly direction, he crossed the Rio Grande del Norte, and entered the San Luis Valley, making his way out over the Sangre de Christo Pass to the plains of Southern Colorado; thence southward

may, in some distant age, have been used as galleries for low-grade gods who wished to see the play." Oak Creek Cañon, fifteen miles distant, is another point replete with interest; and when the tourist reaches Curiosity Hill he finds it aptly named, inasmuch as it is covered with all sorts of odd and unique specimens of minerals of more or less value. By the use of the pick or by blasting crystals of remarkable beauty are found imbedded in agate of various colors. Oil Creek Cañon takes its name from the evidences along its banks of the presence of petroleum. Its rocks are full of strange formations that suggest many familiar forms to the beholder. It has been described as a great natural art-gallery, full of fortifications, of pictures, and of sculptured figures.

There are other points of interest in this vicinity that we might name had we space, such as Marble Cave, Talbot Hill, and the celebrated coal-mines, where one can ride for miles through the drifts on a small wooden car, deep down in the bowels of the earth and away from the bright, warm sunshine and the sweet influences of the outer world. The darkness suggests that gnomes might well abound in such a locality, and spring out at any moment to demand toll of the helpless victim caught in the darkness and the gloom of their underground hiding-place.

The Grand Cañon of the Arkansas and the Royal Gorge are now open to the railway-travel of the country, and one can stand upon the brink of vast precipices and gaze down two thousand feet—so far that it is almost impossible to see the foamy current of the Arkansas River as it rushes in tumultuous torrents over its "cribbed, cabined, and confined" narrow bed. In this deep defile the sunshine seldom penetrates, and the blue sky is as much a novelty as a pencil of sunshine would be suddenly streaming through a keyhole into a cell to its solitary occupant. The old way of seeing the cañon was from above, but its sublime grandeur is heightened by observations within its defiles. One can look up without dizziness, but to look down is often dangerous; one glance is sufficient to many who are not counted timorous. To look down a perpendicular wall two thousand feet is no trifling performance. Looking up, one sees "overhanging crags, black and blasted at their summits, reaching up into profoundly dizzy heights, while monstrous rocks threaten to topple down and carry to destruction any foolhardy climber who would venture upon them." More of awe than admiration is excited by a visit to this cañon and gorge. The tremendous forces of Nature, as displayed in this bit of her handiwork, are calculated to impress solemnity upon the mind of the beholder; for, added to the sublimity, there is a certain underlying sense of danger in the situation that makes one ever cautious of speech in a defile where sound can dislodge a fragment of rock and send it hurtling down to the ground on which stands the awestruck visitor.

La Veta Pass is another point of exceeding great interest. One must have seen the mountain-regions in the early days in Colorado, when "bull-teams" and "prairie-schooners" were the only conveyances within the reach of the traveller, to fully appreciate the ease, convenience, and swiftness of travel in these railway eras. One of the finest rides in the world—rivalling, and perhaps excelling, the famous scenery in the gorge of the Wahsatch range lying south of Salt Lake—is found in the enchanting trip from La Veta, a cozy little village lying at the feet of the Spanish Peaks, over the celebrated Sangre de Christo range to the summit, from whence the road runs down to the valley of the Rio Grande del Norte. It is one of bewildering beauty, and has called forth the encomiums of talented writers and of people of all grades and professions. One is lost in wonder at the skill displayed as seemingly inaccessible heights are scaled and the gallant little engine puffs and pulls its train around Muleshoe Bend, where it takes a run of two miles to gain a distance of one quarter and four hundred feet in elevation. From La Veta to Garland the ride may be denominated one magnificent panorama of natural beauty, changing as the conformations of the kaleidoscope change. Here are to be met towering and storm-splintered crags, whose vast masses of primitive porphyry tell a silent but suggestive story of the days when the fiery element forced them upward into the atmosphere. In the distance, like a dream of glory, Sierra Blanca lifts its eternal snow-covered summit to the empyrean, 14,464 feet above the level of the sea, the superb culmination of that mighty accumulation of mountain-ranges known as the Sangre de Christo. The pass at its summit is 9339 feet, and the Denver and Rio Grande Railway was the first in the United States to attain such an elevation. In a distance of a little over fourteen miles an elevation of 2250 feet is reached. In order to make the comparison clearer, we will mention that the elevation at the summit is one mile higher than at Pueblo, while Blanca Peak towers still a mile higher.

Buena Vista is the latest candidate for the favor of the tourist, and during the coming season of travel will claim, and readily obtain, its share of attention. It is located on both sides of Cottonwood Creek, near where it empties into the Arkansas, and at the entrance to a pleasant valley opening out on a plateau some five miles wide. A park containing a large lake has been set apart for public use, and sailboats are kept for the accommodation of visitors. Good hunting and fishing are in the immediate vicinity, while five miles from the town are the celebrated Cottonwood Hot Springs, becoming favorably known for their efficacy in curing rheumatism and neuralgia in their most aggravating forms. In the immediate vicinity are some of the noblest mountain-peaks of the mighty range, lifting their summits up to the clouds. There is but little doubt that Buena Vista, with its splendid site, beautiful scenery, close proximity to first-class hunting- and fishing-grounds, located at the junction of two railroads, which here intersect each other, will in the near future make this the tourist-town of the Arkansas Valley.

Ten-Mile Cañon lies midway between the passes on the grand continental Divide, covering a distance of perhaps twenty miles. The railroad projected from Georgetown to Leadville will pass through it. To the tourist the views hereabout will be at once entrancing and bewildering, for here Nature has grouped her wonders into a scene of lavish and picturesque confusion. The cañon is destined in the near future to be one of the most popular resorts in the mountains. The landscape is singularly broken and strikingly picturesque. A writer in describing this cañon, of which comparatively little is known, says: "What a storm is to the elements the cañon is to the surrounding scene. It stands alone and apart from all the rest—a rugged defile dropped in the midst of the rugged mountains. Led into it by the ripple and flash of foam-crested waters, one pauses in the midst of miniature cascades to watch through the spray-laden air the grand ascent of the rocky barriers which shut it in. Thousands of feet in air they rise precipitously, not swart and black as other ramparts do, but variegated as the colors in a picture; on a ground of glittering white are veins of crimson, blue, and gold; the rocks mirror on their surface all the colors of the rainbow. Artists would call it a mountain-gorge shut in by walls of variegated marble. It looks like layers of distinct and curious formations. But in one rock, a vast mass of veined granite, it catches and reflects every shade of light. Mirrored on its surface, the sun waves back in glittering landscapes of quivering shade. The spray, cast by the dash and splutter of the waters as they foam and lunge over rocky and abrupt declivities, rises like a veil of mist. The sun, glancing from the overhanging crests, mirrors the scene and catches the various shades and lights as in a prism of wonderful and indescribable beauty. Crowning them like a cross, midway the gorge, rise two columns named Loveland Peaks, twin sentinels of the rugged scene. On the summit of a mountain ten thousand feet in air, they shoot up the rugged surface like momentous spires in the midst of desolate surroundings. Hundreds of feet above the tallest peaks, they stand desolate and grand as Egyptian pyramids—tall columns which catch and

INTERIOR OF SHAFT-HOUSE, LEADVILLE.

reflect every slanting ray of light. Some day the tourist will make this Colorado scene his Mecca, as the Moslem turns to the shrine of his faith, watching in the day's decline the wonderful spectacle of sunshine and shadow, and the weird, rugged sublimity of mountain-gorge, materializing a dream of beauty which far outstrips the achievements of the painter's pencil." These scenic beauties will be open to the tourist world when the High Line road reaches out from Georgetown over the range, and opens up the profuse and elaborate scenery to the traveller, mingling the thrilling with the beautiful in the grand panorama of our mountain-attractions.

PARKS AND RIVERS OF COLORADO.

A peculiar feature of the State is its mountain-girt parks. These are great basins, with surface and soil more or less similar to that of the Plains, but surrounded by lofty mountains whose elevation reaches from seven to ten thousand feet above them. These parks are generally well watered, abundantly timbered, and abounding in springs containing mineral waters.

There are four great parks, separated from each other by narrow but lofty mountain-ranges. The entire chain can be easily traversed, and as they abound in fish and game, and present some of the most varied, romantic, and beautiful scenery imaginable, it will be seen that they are points of great interest to tourists and hunters.

North Park is near the northern boundary of the State. Within it the North Platte River takes its rise. It is a circular basin some thirty miles in diameter, and is the most timbered and lofty of the parks. It has not, as yet, attracted much attention; still, its points of interest are not easily excelled elsewhere, and there is a possibility of vast mineral resources lying hidden within the hills that surround it. There are, as yet, but few settlements within its boundaries. It is easily reached from Fort Collins, on the Colorado branch of the Union Pacific Railroad.

Middle Park adjoins it, and is very much larger. It has a diameter of about fifty miles. It is drained on the west by Grand River, whose exit is by a cañon of sublime depth and awful grandeur. Spurs of lofty mountains shoot far out toward its centre. Hot Sulphur Springs in the middle of the park is quite a summer resort. Some considerable settlements have been established within the park, and it is reached by a line of stages from Georgetown.

South Park, by the advent of the Denver and South Park Railway, that traverses its entire length, is now beginning to be well known. In it the South Platte takes its rise. It is about forty miles wide and seventy miles long. Its central basin is one vast meadow, capable of sustaining millions of cattle. Its rim and its spurs abound in gold- and silver-mines.

San Luis Park lies in the extreme southern part of the State, and is the lowest in altitude, while it is the longest in extent, of the four great parks. It is drained by the Rio Grande del Norte, which flows in a southerly direction through it, and thence in a south-easterly course seeks the Gulf of Mexico. This park has always been the favorite place of settlement for the Mexican population of the State, but the advent of the Denver and Rio Grande Railway into it, and the consequent entrance of a thrifty white population, are rapidly driving this shiftless class into New Mexico, and replacing them with the elements that go to strengthen and exalt society and the State. The farming resources of San Luis Valley are vast and of untold value. In the years to come it will be a beehive of agricultural industry.

There are hundreds of other parks, varying in size from ten to a thousand acres, scattered all over the State. Estes Park, perhaps, might be mentioned as one of the largest of this coterie of cozy nooks hidden in the hills. Through it visitors pass to make the ascent of Long's Peak. In its mountain-streams are abundance of trout, while all kinds of game can also be found in it. It is a favorite resort for tourists, and is reached by rail to Longmont, and thence by an easy coach-ride of five hours.

The principal rivers of the Plains region of Colorado are the South Platte and the Arkansas. These have their sources in the mountains, and as they reach the Plains are fed by many small streams. The first drains the South Park and the range from Denver north to the boundary of the State. Its source is near Mount Lincoln, and its principal branches within the park are High, Little, Platte, Trout, and Tarryall Creeks. Its general course is in a north-easterly direction, and after it leaves the cañon its principal affluents are Bear, Turkey, Clear, Ralston, St. Vrain's, Coal, Boulder, Left-Hand, Big and Little Thompson, and the Cache-la-Poudre. The valley of the South Platte, from its exit from the cañon to where it leaves the State, is two hundred and fourteen miles long, with an average width of two miles, containing about four hundred square miles of bottom-land. The main stream, with its branches, is supposed to carry water enough to irrigate about fifteen thousand square miles of arable land, on the supposition that three cubic feet per second will irrigate one square mile.

The Arkansas River rises near Tennessee Pass, flows through small valleys and cañons—the main one being the celebrated cañon of the Arkansas—in a general southerly direction until it reaches La Junta, where it turns east and leaves the State. A number of short streams contribute to its volume of water in the mountains. The most important of these are Grape, Texas, Chalk, Cottonwood, Elbert, Oil, Currant, Badger, Trout, and the South and East Arkansas. On the Plains it receives the Purgatoire, Apishpa, Huerfano, Cucharas, St. Charles, Greenhorn, Hardscrabble, Fontaine-qui-Bouille, and Monument. The area of arable land and of its branches has been estimated to be nearly two thousand square miles; these valley-lands are not cultivated so extensively as are those on the South Platte and its branches, but attention is being drawn to them as equally desirable for agricultural and horticultural purposes.

The Rio Grande del Norte heads in the heart of the San Juan Mountains. From the great snowfields and the abundant rainfall of these high mountains the stream grows rapidly, and when it enters the valley of San Luis Park it is one of the largest streams in the State. Here several good-sized tributaries add to its volume. The principal ones are the Alamosa, La Jara, Conejos, Rio San Antonio, Trinchera, Culebra, and Costilla. The agricultural capabilities of this stream and its branches are measured solely by the supply of water. The soil being of a more sandy nature, a larger amount of water is required than in the northern part of the State, and five cubic feet per second has been allowed in this estimate. About eight hundred square miles of land are capable of being supplied with water enough for cultivation. The San Luis Valley is now mainly given over to grazing, but it is beyond question that it will yet be the garden-spot of the State.

The San Juan River drains the southern slopes of the San Juan Mountains, and the land capable of being utilized is distributed in narrow belts in and near the mountains. Its main branches are the Piedra, Los Pinos, Las Animas, La Plata, and Mancos. These have more or less of cultivated land, supporting a population mainly composed of Mexicans.

The Grand River heads among the snowfields of the western slope of the front range in Middle Park. It covers a drainage-area of over twenty-two thousand square miles. Its principal tributaries in the park are North Fork, Willow, Troublesome, Muddy, Frazer, Williams, and the Blue. All of these are in valleys of more or less width, but containing little arable land, principally lying on the Frazer and the Blue. A succession of short cañons follow until the Gunnison is reached.

The Gunnison River heads in the Sawatch range, and has for its tributaries Tomichi, White Earth, Lake Fork, Cebolla, Uncompahgre, Dolores, and San Miguel Creeks. All of these branches have more or less irrigable areas, while the Gunnison proper, in what is known as the Uncompahgre Valley, has an abundance of land and water.

The White River has its rise in high plateaus which reach the timber-line. Its course is westward, and it flows in a narrow valley limited by cañon-walls. Its arable belt of land is extremely small, except at the point where the White River Agency is located, where it branches out into a belt five miles wide and about the same in length. It has not land enough to use up the flow of water.

The Yampah River heads in Egeria Park, flowing north for about thirty miles, then turning to the west. Its main branches are the Little Snake, Elkhead, and Sage. It is stated that there is an arable area of about three hundred and fifty square miles in this valley and its tributaries, with an abundance of water for all that can be cultivated.

RESOURCES.

Arapahoe county includes a strip of country about thirty miles wide and one hundred and seventy-five miles long, with its eastern limit at the Kansas State line, and is entirely upon the Plains. It possesses no mineral deposits save coal, and but little timber. Its agricultural industries, however, are of great importance, and are likely to become still more so by the completion of a canal of immense size and length called the Platte Canal. The soil is well adapted to the growth of all the cereals and vegetables, while in the vicinity of Denver considerable attention has been paid to fruit-raising. Denver is the principal city, and as a mercantile, manufacturing, and railway centre contributes greatly to the wealth of the country. Of Denver we treat more fully under a separate head.

Littleton, Petersburg, Brighton, Box Elder, and Deer Trail are small villages in Arapahoe county, and the centres of agricultural and stock interests. The amount of land returned last year as in cultivation in the county was 131,424 acres, at a valuation, including improvements, of $2,583,255, but the taxable wealth of the whole county is set down at $31,000,000.

Bent county comprises a district sixty-eight miles wide and one hundred and eight long, and is one of the great grazing-districts of the State. It is but sparsely settled, and at present cattle- and sheep-raising are its principal resources. But the Arkansas River runs through the southern half of its limits, and the land is well adapted to cultivation. The Atchison, Topeka, and Santa Fé Railway runs through it, and at La

Junta a branch goes down to Trinidad. West Las Animas is the county-seat and principal town. The Las Animas River empties into the Arkansas at this point, and the lands in this valley are occupied by quite a thrifty class of farmers. The taxable wealth of the county amounts to $5,000,000.

BOULDER county is part plains and part mountains, the latter predominating. It is one of the best developed and richest counties, aside from Arapahoe, in the State. Its fertile valleys are filled with industrious husbandmen, while its hills and mountains are stocked with precious metals. Gold, silver, iron, coal,—these are the principal resources. Here, in this county, the first discovery of gold was made (in 1858), and its belt of mines extends the entire length of the county, while its silver-mines include the world-renowned Caribou and others of well-known value. Long's Peak lies within its borders, while the valleys of St. Vrain, Boulder, Left-Hand, and Ralston enrich its eastern limits with extensive tracts of arable land, all well dotted over with the comfortable homes of well-to-do farmers. The coal-beds of Boulder county are no unimportant item of its resources. They underlie the whole eastern strip, and are worked at several points, yielding the finest coal found in the northern part of the State. Fire and potters' clays also exist. An abundance of timber is in the mountains. Excellent water-power, beautiful scenery, a healthy climate, vast mineral deposits, unrivalled agricultural facilities,—these place Boulder county in the front rank of the counties of Colorado, ensuring it a career of future prosperity. At present, its mines, like those of the San Juan, are not attracting the attention they deserve; but when the carbonate fever is over the lodes in this district will be a permanent source of wealth to their fortunate owners.

The area of the county is about nine hundred square miles. The principal towns are Boulder, Longmont, Valmont, Louisville, Sunshine, Jamestown, Gold Hill, Salina, Ni Wot, and Pella. Farming-lands were returned last year by the assessor at a valuation of a million and a half of dollars on 127,485 acres, while the entire valuation of the county foots up to nearly $7,000,000.

CLEAR CREEK county three years ago was the principal silver-producing county in the State. The Leadville district leads in the race now, but the silver-mines of this county are still being worked to a considerable extent, and constitute the principal resources of the district. It is a small-sized county, 15 by 35 miles, full of good water-power and excellent mill-sites, with some little agricultural land; but mining, milling, manufacturing, and grazing are the main reliance of its inhabitants. Clear

Creek is the principal stream, but this has numerous branches, flowing through ranges of mountains traversed by belts of silver- and gold-lodes and covered with timber. Clear Creek Cañon is referred to elsewhere. The principal towns are Georgetown, Idaho Springs, Empire, and Silver Plume. The narrow-gauge system of railway reaches Idaho Springs and Georgetown, and is likely to be extended beyond the latter point, over what is known as the High-Line route, to Leadville. The real estate and personal property of the county foots up to nearly $4,000,000.

CHAFFEE county is one of the latest formed counties in the State, having the Saguache range for its western boundary and the Park range for its eastern. Leadville lies directly north, in the adjoining county of Lake. The Arkansas River runs through it north and south. Gulch-, placer-, and lode-mining are carried on to some extent. Some noble mountains, such as Mounts Harvard, Yale, Princeton, and Shavano, are within its boundaries. The town of Buena Vista, founded last year, is attaining considerable prominence as a business-centre, while its nearness to some famous hot springs on the Cottonwood, about ten miles away, will tend to make it a resort for invalids. Cleora and Granite are promising towns in this county.

CONEJOS county is one of the somewhat isolated districts of the State. Railway communication ends at Alamosa on its eastern border, but the bed of the Denver and Rio Grande Railway is graded to Conejos, the county-seat, and the cars will reach it before the year is ended. The resources of the county are almost wholly undeveloped. Alamosa is its principal town, and an extensive trading business is carried on with the mountain-regions on the west. It is also the present shipping-point for the trade with New Mexico. The celebrated Pagosa Springs are in the western part. It has a large number of villages or *plazas*, wherein Mexicans cluster. Nearly one-half of the county is forbidden ground for the white man, being in the Ute Reservation. There is a large area of well-watered and arable land, but thrifty and enterprising people are needed to develop the at present hidden resources. The taxable property last year amounted to only $750,000.

COSTILLA county is in the San Luis Valley, and has the Rio Grande del Norte for its western boundary, while the railway runs through it from east to west. It boasts of the highest mountain in the range, Mount Blanca. It has within it several small streams, principally the Costilla, Culebra, Trinchera, and Sangre de Christo, in whose valleys more or less rude agricultural pursuits are followed by the residents, who are mainly Mexicans, and whose principal industry is the raising of a few sheep, horses, goats, asses, and cattle. Fort Garland, an important military post, is in this county. There are large areas of arable land susceptible of cultivation for cereals by irrigation-canals from the Rio Grande River, but they must await the coming of a thriftier set of people than the Mexicans, who now are in the majority. The taxable wealth of the county is returned at a little over a million of dollars.

CUSTER county has within its borders Silver Cliff, whose importance as a mineral district is beginning to be recognized by the outside world. The Sangre de Christo range is its western boundary, while in the south-east rise the Wet Mountains, giving a name to the valley between, whose pastoral and farming resources are very large, though as yet but scantily developed. Silver Cliff, Rosita, Ula, and Colfax are the principal towns. The mines in the vicinity of the two first named have been demonstrated to be of extraordinary richness, and their development will make the district a point to which prospectors and capitalists will be directed.

DOUGLAS county lies south of Arapahoe, and is traversed by the Denver and Rio Grande Railway. In connection with Elbert county, on the east, it takes in what is known as the "Divide" country, a belt of high land separating the valley of the South Platte from that of the Arkansas. It is a timbered region, with some stock-raising and agricultural resources. Farming is carried on here without irrigation, the altitude conducing to frequent rainfalls during the growing season. It is becoming noted as a dairying district, springs and sheltered places abounding on either slope of the Divide. Several small streams course through it, but they furnish no reliable water for irrigating purposes. The principal towns are on the line of the Denver and Rio Grande Railway. Castle Rock is known for its extensive stone-quarries, and furnishes this material in abundance for the Denver market. The iron ore of Douglas county, when developed, will be one of its principal resources. At present stock-raising and agriculture predominate.

ELBERT county is a cattle county, lying east of Douglas and taking in part of the Divide. The Kansas Pacific Railway runs through it in a south-easterly direction, and the main settlements are along the line of the road. Cattle and sheep are the principal industries, though some attention is paid to dairying and farming in the western part. The taxable wealth of the county is $300,000. A considerable portion of the lands are unsurveyed, and are the roaming-grounds of the antelope and buffalo.

EL PASO county is the leading sheep-raising district in the State, returning nearly one hundred and twenty-five thousand in 1879. It has thousand feet overhead to join the sheeny tide that murmurs its sad refrain at the bottom of a gorge; then a lateral cañon is passed, glorious in its wealth of verdure or grim in its poverty of life; here a grand old hill, exquisitely rounded and covered with a beautiful growth of pine or spruce; near it a weatherbeaten mound, so thickly strewn with fallen timber as to suggest a mammoth game of jackstraw, with the Devil and his imps for players; opposite it, mayhap, a perpendicular wall of granite of varied hue—greenish-yellow, yellowish-pink, gray and black mottle—the ever-changing lichens lending additional beauty to its wrinkled front; then a mass of gnarled and twisted granite, gnarled into twists and twisted out of all semblance of shape. Thus for ten miles or more the cañon presents a panorama of Nature in her wildest, most weird, and grotesque moods."

About Colorado Springs, within a radius of twelve miles, there clusters a greater number of natural scenic beauties than anywhere else in the State. These points have been written up by journalists and tourists and bookmakers to so great an extent that their names are familiar to all, and Manitou, Cheyenne Cañon, Ute Pass, Garden of the Gods, Glen Eyrie, Queen's Cañon, Monument Park, and Pike's Peak are as household words everywhere. Manitou has become the fashionable watering-place of the Western continent. It has an elevation of 6321 feet in six miles from Colorado Springs, and has six famous mineral springs, whose medicinal qualities have been highly recommended. Manitou in summer is a rural paradise; the waters of the Fontaine-qui-Bouille ripple musically through the romantic valley; along the banks of the stream cottonwoods, pines, cedars, and willows abound, giving abundant shade, aside from that cast by the hills about it. In this secluded retreat charming cottages abound, and many of the wealthy and well-known citizens of the United States here seek during the summer months that recreation and repose so much needed by brain-workers.

Ute Pass is a narrow roadway built almost out of perpendicular walls of rock and full of tiny waterfalls, where the Fontaine-qui-Bouille drops down from its source in the hills beyond; but its solitude has been for ever destroyed by the track of the long wagon-trains and the uncouth voices of rough mule-drivers *en route* to the Carbonate Camp. It is still, however, visited in the cool of the evening by the *habitués* of Manitou.

The Garden of the Gods, as it is called, lies about two miles west of Manitou, and is easily reached; it is a singularly picturesque spot, replete with interest. Two high ridges of white and red sandstone rocks rise perpendicularly in air about three hundred feet high, forming a sort of amphitheatre, the entrance to which is an opening in rocks but a few rods apart. There is a weird grandeur about this spot suggesting natural forces that must, in ages long past, have mingled and combated with fiery energy to leave behind them such monuments of fantastic shapes.

Cheyenne Cañon is some seven miles south of the city of Colorado Springs, and a carriage-drive there gives one an opportunity to explore the quiet beauty and enjoy a few hours of unmixed pleasure. The path up the cañon is intricate, and can only be made on foot, but it will amply repay those who find their way to the foot of the seven falls to watch the ribbons of liquid silver unfurl and droop downward to the basin waiting to gather and hide them in its bosom for a moment, and then send them coursing down over the stones to the outlet beyond.

Glen Eyrie, the summer residence of Gen. William J. Palmer, President of the Denver and Rio Grande Railway, is a lovely dell, full of points of interest and beauty, especially Queen's Cañon, with its charming waterfalls, Hebe's Bowl, tiny rivulet, and rugged scenery.

Monument Park takes its name from the many remarkable forms carved out of sandstone in days agone by. Scores of columns can be found standing, alone, in groups, and in combined masses, each one surmounted with a cap of some harder material, probably sand cemented with oxide of iron, and so more capable of resisting erosion. Air, rain, snow, water, have left behind them a record full of curious interest to the tourist, of study to the geologist, in these monuments, and the visitor can take unqualified delight in tracing beast, bird, man, woman, cathedrals, groups of statuary, and the multifold forms of art and Nature in these grotesque formations.

Cañon City is the warder of a combination of cañons whose natural beauty borders on the sublime. These cañons and gorges are full of pleasure to all who take delight in beholding the wonderful beauties of Nature in all her ruggedness of repose. We can touch but briefly upon a few of these. Grape Creek Cañon is named from the vines that hang so abundantly upon its crags, and the defile is singularly beautiful; its sides present rocks with all the colors of the rainbow, lifted up to various heights, and of all shapes, some of them extremely grotesque. Temple Cañon, entered from Grape Cañon, has thus been described: "Nature has carved a wondrous structure which is an exact counterpart of what we mortals know as a theatre. Before a broad floor there stands an immense stage, with a flat and flies and wings and dressing-room; while the broad plateau in front makes an excellent orchestra, and one may readily find room for the fancy that the ledges towering hundreds of feet above

WILLIAMS CAÑON, COLORADO SPRINGS.

BY THOMAS MORAN.

that have yielded millions of dollars' worth, and will yet yield millions of dollars' worth more. The mercantile and commercial interests of the county are important, and are skilfully managed by a class of merchants and business-men possessing unusual enterprise and ability. The altitude of Central City is eight thousand three hundred feet, while the average of the county reaches nine thousand. The climate of the district is mild and healthy. Railway communication is had by the narrow-gauge system, and the ride from Black Hawk to Central, where several miles are traversed to gain one in distance, is one of the grandest in the world.

GRAND county lies in the northern part of the State, between Larimer and Routt. It comprises within its borders North and Middle Parks and the Rabbit Ear range of mountains, in which some silver-veins have been discovered. The famous Hot Sulphur Springs are in the last-named park. The North Fork of the Grande, the North Platte, and the Cache-la-Poudre Rivers have their rise in the centre of the county. It is a region of vast possibilities, and may yet become renowned for its mineral deposits. Middle Park and the Hot Sulphur Springs are reached by coach from Georgetown—North Park from Fort Collins, on the Cheyenne branch of the Colorado Central Railroad.

GUNNISON COUNTY.—"To Gunnison?" is to be the rallying-cry of thousands this season, who hope to find fabulous wealth within its hidden defiles and bosky dells. It has within its boundaries noble rivers of which but little is known, while countless smaller streams traverse the valleys of this comparatively *terra incognita* of Colorado. To reach it a lofty range of mountains, whose passes are always full of snow, must be crossed. The Elk Mountains are on the eastern boundary, while stretching far to the west are mighty ranges whose resources will not be definitely known until the Indians are driven out of the country and white men allowed to enter and explore them. In a number of districts bordering on the reservation mineral veins of value have been found, but their richness and importance have not been thoroughly demonstrated.

HINSDALE county is part and parcel of the San Juan country, and is a region laboring under the general disadvantages made up of difficult mountain-ranges, remoteness from railway communication, and want of confidence of capitalists to invest in mines at such a distant point. But the county is undeniably rich in mineral wealth, and Lake City, its capital, is the centre of an important silver-producing district. Smelting-works have been put in, and are in successful operation. The taxable wealth of the county is set down at $1,000,000.

Huerfano county lies in the southern part of the State, and takes its name from the river that runs through it, and which, with the Cucharas and Apache, gives valleys in which about forty thousand acres of choice agricultural land await a better development than the present population —which is mainly of Mexican descent—is likely to give it. At present cattle- and sheep-raising is followed. Corn can be grown in great abundance, and the soil seems to be admirably adapted to its cultivation. Amber cane would be a good crop, and will probably be one of the important industries of the county in the near future. The Spanish Peaks are on its southern line, and on these some silver-mines are being worked to good advantage; but it cannot be said that much attention is being paid to the metals that may exist in the mountainous portion of the county. Considerable coal is mined at Walsenburg, one of its principal towns. La Veta, Cucharas, and Santa Clara are the other most important towns. On the western border rises the great Sangre de Christo range, with Veta Pass and Muleshoe Bend to attract tourists over the line of the Denver and Rio Grande Railway, which enters the county from the north and runs through it in a southerly direction to El Moro, while the main line turns at Cucharas for La Veta Valley, climbing the celebrated pass and running down into the San Luis Valley. The present valuation of the real and personal property of Huerfano county is $2,000,000.

Jefferson county is part plains-land and part foot-hills, running north and south, with the valley of the South Platte traversing its eastern boundary. Its agriculture is its main feature, though fire-clay, gypsum, potter's clay, building-stone, and coal abound. There is but little unoccupied land in this county. It possesses an abundance of cheap fuel in its mines of coal; inexhaustible supplies of excellent building material in its stone; superior water-powers; large tracts of timber afford good lumber in unlimited quantities. The Colorado Central gives ample transportation for the products of the county to Denver and the markets of the State, and places it in direct communication with all the commercial centres of the country.

Golden is the principal city and the county-seat, the home of manufactures, mines, mercantile enterprises, educational and religious institutions. Morrison, famous for its quarries of stone, is reached by the Denver and South Park road, and is a cozy little nook hidden in the hills. There is still ample room for thousands of industrious farmers, artisans, and miners within the limits of Jefferson county.

Lake county has Leadville for its principal attraction. The county, originally one of the largest in the State, is now one of the smallest in extent, and illustrates the axiom that whatever is most precious is small in size. It is full of gulches that were once the centre of attraction for thousands of miners who were drawn to it in the early days of Colorado's history, then abandoned, but are now the Mecca toward which a steady tide of human beings are flowing in search of carbonates. Mining is the only industry of the county, but as the output of the present year is likely to amount to $25,000,000, it will readily be seen that these mines are a sufficient attraction in themselves, and Lake county needs no other. The name of Leadville is a synonym for untold riches that lie hidden in the vast mineral areas of the district. Mounts Massive and Elbert lift their stately summits to the clouds within its borders, while those gems of liquid beauty, the Twin Lakes, will be a point of interest for tourists for all time to come. Now that railroad communication has reached the Carbonate Camp, no visitor to the State can afford to leave it without a look at Leadville, to which we devote a special heading elsewhere.

La Plata county lies west of Conejos, in the extreme south-west corner of the State. It borders New Mexico, Utah, and Arizona, and is rich in coal, silver-veins, and gold-placers, and contains many fine fertile valleys. Within this county are the celebrated ruins now so well known through the reports of Hayden's surveys, and to which reference is made in these pages. The coal-lands of this county are estimated at over six hundred square miles, and will be a source of immense wealth when railroads shall reach this far-off corner of Colorado and reveal its wonders, its mineral wealth, and its agricultural resources to the world.

Larimer county is one of the three principal agricultural counties, lying in the northern part of the State, and borders on Wyoming. Its western part is extremely mountainous, while beyond it lies North Park, to which it is the natural highway. The Cache-la-Poudre, one of the most reliable streams on the eastern slope, runs through it in a south-easterly direction. An abundance of timber and magnificent water-power in the foot-hills and mountains give it an assured present and a magnificent future career of prosperity. But it is as an agricultural district that the county is best known at present, and its farming resources are limited only by the amount of water that can be made available. The first large irrigating canal in the State—that constructed by the Union Colony at Greeley—heads in this county, as also does the extensive canal of the Weld and Larimer Canal Company. But most of the arable areas covered by these canals lie in the adjoining county of Weld. Still, enough is covered by these and numerous other canals to make agriculture one of the main resources of the county. Last year the returns showed sixty thousand acres of improved lands, with a valuation of $300,000, while the entire taxable wealth of the county is about $3,000,000. The Colorado Central branch of the Union Pacific Railway gives direct communication with Denver and the mountain-towns, while Cheyenne and the east and west are reached on the north. Fort Collins, Loveland, Livermore, and Wheatland are the principal towns.

Las Animas county lies along the southern boundary of Colorado. Its principal stream is that from which the county is named, and the valley of "The Spirits" forms one of the most magnificent tracts of farming-land in the State. The Denver and Rio Grande and the Atchison, Topeka, and Santa Fé Railways traverse it, while Trinidad and El Moro are its principal towns. At these points a vast and expanding industry has been established: hundreds of coke-ovens are burning night and day. The coal in this vicinity makes excellent coke, for which, of course, the mines furnish a ready market. There is no mining done in this county, but the extensive table-lands furnish unequalled grazing-grounds for sheep, of which the county has over one hundred thousand. The coal-mines are a source of constant revenue, and the valley is capable of sustaining a large farming community whenever a thrifty class enters and occupies the fertile soil.

Ouray county lies west of San Juan, and is part of the San Juan mineral belt of country, full of mountains, ravines, and gorges in which precious metals abound, but with which communication, especially in the winter season, is difficult. This remoteness from civilization has tended to retard its progress, but there is a possibility of a railroad reaching this distant point at an early day, and then a rapid advancement may be looked for. Ouray is the main town in the district. The Dolores plateau, lying west of the belt of mountains traversing the eastern borders of the county, is believed to be capable of agricultural development, but this is not likely to occur at an early day in the history of Colorado.

Park county.—This is the famous South Park country. It lies in a kind of basin, having mighty mountain-ranges for its rim on three sides, while its eastern border is a series of spurs broken by small streams that feed the South Platte River. It is the most centrally-located county in the State, full of mineral springs, salt springs, carbonate deposits, and coal. Within its borders Mount Lincoln rears its lofty head. From its eastern slope the South Platte River starts on its journey to the Plains, while on its western edge its waters seek the Pacific through the channels of the Blue and the Grand Rivers. The Denver and South Park Railway courses through it, and all along its line towns are springing up, to become of more or less importance in future years. Stock-raising is a prominent feature in the industries of this county, the vast area of the park being capable of sustaining countless herds of cattle. Fairplay and Alma are its principal towns.

Pueblo county is a valley-county, lying on each side of the Arkansas River. The Denver and Rio Grande Railway runs through it north and south, and a branch at Pueblo runs west to Cañon City. The Atchison, Topeka, and Santa Fé road enters it from the east, so that Pueblo, the principal town in the county, is an important railroad-point. It is one of the finest agricultural districts in the State, but stock-raising at present predominates. Nearly a hundred thousand cattle and sheep are herded on the plains, while the Arkansas Valley contains two hundred thousand acres of arable land. The Fontaine-qui-Bouille, St. Charles, Chico, and Greenhorn are the principal tributaries to the main river running through it, in whose valleys more or less farming is carried on. It could be made a great fruit-raising section if attention was paid to this industry. The terminus of the Atchison, Topeka, and Santa Fé Railway being at Pueblo for the present, makes it quite a commercial centre, and the city is in a thriving condition. The taxable wealth of the county, in live-stock, real estate, personal property, and railway-tracks, amounts to nearly seven million dollars. There are some extensive cattle- and sheep-ranches here, where Mexican labor is wholly employed, yet but a tithe of its twelve hundred square miles of fertile land is in cultivation.

Rio Grande lies between Conejos and Saguache, and is partly mountainous, with large breadths of plains-land. The Rio Grande del Norte runs along its western border, and San Luis Park lies partly within it. There are several small tributaries feeding the main stream, whose valleys are lined with cultivated farms; but for the most part the vast area of arable land is unoccupied, waiting the coming of those who are to till the productive soil and feed the myriads who will throng the mining districts to the west and north.

Routt county, in the extreme north-west corner of the State, is covered with mountain-ranges and spurs, and with river-valleys in which grazing and agricultural pursuits to some extent could be successfully carried on. Egeria Park is in its south-east corner; Yampah River courses through it from east to west; and the Elkhead range of mountains are the principal ones within its borders. On the head-waters of the Snake and Elk Rivers there are some extensive placer-lands from which considerable gold has been taken, and where flumes and ditches have been constructed. Steamboat Springs are in the eastern part. The county at present is attracting but little attention, but when communication can be had with it easier than at present it will be found capable of supporting a vast population.

Saguache county occupies the northern extremity of San Luis Valley, and has considerable settlements within it, but is capable of sustaining many more. It has a fertile and finely-watered region, scarcely equalled anywhere, whose numerous valleys are great natural meadows covered with vegetation, and whose table-lands afford abundant pasture for sheep and cattle. Perhaps one hundred and fifty thousand acres of land are improved. The taxable wealth of the county is $1,000,000. In addition to its pastoral resources, it contains some of the finest scenery in the State, being hemmed in on the east, north, and west by the Sangre de Christo, Saguache, and Cochetopa Hills. It is a district with great natural attractions and boundless resources, and has an era of prosperity before it whose dawn already casts its light upon the horizon.

San Juan county is a small but exceedingly rich section of country in the south-western part of the State, and is full of mining districts in which thousands of lodes are located, and many of them worked. The discoveries and developments that are constantly in progress, despite the amount of interest excited by Leadville, vindicate the conviction that the great natural resources of the San Juan country are not likely to be forgotten. Indeed, these silver-ribbed rocks can hardly be overlooked. Silverton is the principal town, and one that is steadily growing. A good wagon-road connects it with Ouray, Lake City, and the outside world. The gulches in this district contain many very productive mines, but the wealth that has thus far been brought to light is but trifling to what will yet be realized when capital concentrates at this point. San Juan county has no agricultural resources.

Summit county is one of the extreme north-west counties, lying west of the summit of the Main Range. It is a region as yet undeveloped on its eastern borders, where it is rich in silver-lodes and gold-placers. In the western part of the county coal is said to exist in immense deposits. Some eight millions in gold, silver, and lead have been taken out of this district since Colorado was first settled. New and important mining districts now being developed are attracting some attention. Ten-Mile district has some rich galena-veins that have been lately opened. Eagle River, the Blue, Snake, Swan, and their tributaries, are all likely to become famous points, as they are the last discovered in the extensive mineral regions lying west of the range. The Mountain of the Holy Cross, the subject of J. Harrison Mills's celebrated painting, is in this county.

while Mount Lincoln is on its south-east boundary and Mount Powell on the north. The blood-stained White River Agency lies within it.

Weld county is one of the largest in the State, and lies in the north-east corner. The South Platte River runs through its entire length, while the Denver Pacific Railway passes down its western edge. It is wholly a cattle-raising and agricultural county. Within it lies Greeley, the first farming-town established in the State, and the success of which led to the establishment of so many others. It is believed that coal underlies a good part of the western portion, but this is only conjecture, save in the extreme south-west corner, at Erie, where mines are worked. The valley of the South Platte is one capable of raising, by systematic and economic irrigation, food enough to supply the wants of the people of the entire State. Out on the Plains, beyond Greeley, some attention is paid to sheep-raising, and there are large herds of cattle kept between the river and the Territory of Wyoming on the north. When the railway system of the country reaches and occupies the South Platte Valley, it will open up a splendid country and develop the resources of this county to a very large extent. The principal towns are Greeley, Evans, Platteville, and Erie. The taxable property reaches $7,000,000. The construction of the Weld and Larimer County Canal throws open thousands of acres to cultivation, and when these are utilized Weld will stand in the front rank as a county whose agricultural resources are unbounded save by the volume of water in its streams.

THE FLORA OF COLORADO.

The flora of the State is full of interest to the casual observer, the lover of flowers, and the botanist. For many months in the year the plains, the foot-hills, the very sides of the mountains, are covered with the common wild flowers that luxuriate in the bright sunshine and dry air. Here is not found such wealth of foliage as abounds in moister climates; the blossoms predominate to a remarkable degree. The botanist, wandering through the Sangre de Christo range, tramples down whole fields of white and blue larkspur and delicate mertensia. The summits are crowned with phlox and forget-me-nots. The fields of Wet Mountain Valley are full of clover, iris, and lilies. Wild roses bloom along the banks of every stream, great or small. Ipomea covers the mesas, abronias whiten innumerable acres of land, while the large, conspicuous flowers of the *Mirabilis multiflora* are seen opening their petals late in the afternoon and showing fresh, bright faces to the passer-by. The syringa grows wherever it can find a foothold, the cañons are alive with fallugia, while wherever little streams of water dash over the rocks in the foot-hills and lose themselves in mist the golden columbine and aquilegia grow to perfection. The scarlet and the blue pentstemon, the brilliant gillia, spireas, and hosts of less showy but equally interesting plants occupy every available spot.

Especially in Southern Colorado is the flora of the Plains and foot-hills remarkable for abundance, variety, and brilliance. The low elevation of the Arkansas Valley and its tributaries has induced many of the most noticeable and beautiful specimens, whose home is in New Mexico, to find a resting-place here and to grow abundantly. The parks are dotted with the tree-cactus and the frankenia, while at least thirteen species of cactus abound, from the familiar prickly-pear with long flat joints and sharp thorns and handsome yellow flowers, up to the tree-cactus with its large purple flowers and sharp thorns, growing twelve feet in height in favorable localities. Here and there solitary cones of *Cereus fenaleri* can occasionally be found, bearing two or three large purple-flaming blossoms, while up on the mountain-sides flourish in great abundance hemispherical masses of *Cereus phœnicus*, scarlet with a hundred blossoms and bristling with a thousand spines.

A world of floral beauty, it may therefore be said, is open to all beholders in this State, so rich in resources in its valleys, plains, hills, and cliffs. It may be called the Wonderland of America, and its flora will be an irresistible attraction during the summer and fall months for all who have an eye to the beauties of Nature unchanged by human art.

WILD ANIMALS.

Middle Park may be taken as a fair type of the fauna of the mountain-regions of Colorado. As it contains lakes and streams, plains and hills, it may be looked upon as a miniature State, and in describing the animals of this section we describe those of all Colorado.

The following have been seen or killed in the park or on the mountains that surround it:

Of the bear family (*Uræus*): The common black (*americanus*); brown or cinnamon (*arctus*); grizzly (*ferox*).

Of the wolf family (*Lupus*): The common (*canis*); prairie (*latros*); wolverine (*Gulo lucus*).

Of the fox family (*Vulpus*): The common red (*vulgaris*); black (*alopex*); silver (*argenteus*).

Of the deer family: The common (*Cervus virginianus*); the antelope

RESTORED TOWER AND CLIFF-HOUSES.

(*Antilocapra cervicapra*); the elk or moose (*Aleci americanus*); the mountain-sheep (*Ovis montana*, resembling the *Caprovis musimon* of Europe).

In addition to these may be named:

The cougar or panther, generally called the Rocky Mountain lion. This fierce animal is found all through the Rocky Mountains.

The lynx (*Felis canadensis*), very common in the parks. It is called the wild-cat, and sometimes, erroneously, the catamount.

The pole-cat (*Putorius vulgaris* of the naturalists, and seems to be a cosmopolite).

The mink (*Putorius vison*), valued for its skin, being covered with fine fur.

The beaver (*Castor americanus*). This is perhaps the same as the European *Castor fiber*. Its fur is well known.

The otter (*Lutra canadensis* or *Lutra mollis*, so called on account of the softness of its fur). It is an aquatic animal, and found only in lakes and streams.

The muskrat (*Fiber zibethicus*), a genuine native American, and found in no other part of the world.

The woodchuck (*Arctomys monax*), sometimes called the ground-hog, and found all over the country.

ANCIENT RUINS.

South-western Colorado is one vast network of ruins, indicating an age in the far past when its valleys and mountains were filled with an enterprising people. It is asserted that there is scarcely a square mile in six thousand examined by the Hayden Expedition that does not furnish evidence of previous occupation by a race totally distinct from the nomadic savages who hold it now, and which must have been in many ways superior to the latter. These ruins are in a great measure the remnants of stone structures, some of them of large dimensions, and have been classed under general heads: Lowland or agricultural settlements; cave-dwellings; cliff-houses or fortresses. The first of these are on the river-bottoms, close to water; the second are excavations in the bluffs; the third are built high up in steep, almost inaccessible, cliffs. Rock-inscriptions are numerous, both engraved and painted on the cliffs. Remains of pottery and flint-chips are abundant. The number of these ruins precludes the possibility of mentioning them save in a general way.

The section of country in which they are principally found is that drained by the San Juan River, reaching from the Sierra Abajo on the north to Choco Cañon on the south, and covering an area of some twenty

Pike's Peak, Manitou, Monument Park, the Petrified Forest, Cheyenne Cañon, and the Garden of the Gods as points of interest for tourists. The Fontaine-qui-Bouille, a tributary of the Arkansas, is the main stream within its borders, and in its valley lie some choice tracts of farming-land. But there is a general lack of water for irrigation, and this county cannot look forward to any great agricultural development unless artesian wells are demonstrated to be feasible. The western part of the county is mountainous, but there have been, as yet, no discoveries of minerals of any great value. Its wealth is in its plains, where a million sheep could find sustenance, and in its beautiful city of Colorado Springs and the numberless attractions in that vicinity, that draw yearly a steady stream of visitors. The taxable wealth is between five and six millions of dollars. The Denver and Rio Grande Railway runs through it from north to south, and there are several stations—Monument being the principal one—of more or less importance on the line of the road.

FREMONT COUNTY.—The Arkansas River passes through the entire length of this county. It is one of the most promising in the State, comprising as it does within its boundaries coal, gypsum, iron, marble, alum, petroleum, and some of the finest fruit-lands in the State. The coal of Cañon City is a bituminous coal of superior quality, and cannot be mined in sufficient quantities to meet the demand. The Grand Cañon of the Arkansas is reached from Cañon City, and is one of the wonders of the Western World. Soda springs abound within its borders. One of the main highways to Leadville runs through it. Considerable attention has been paid to fruit-culture in the valley of the Arkansas east of Cañon City, and it boasts the largest apple-orchard in the State, yielding over two thousand bushels last year. Grapes grow in abundance, while the foot-hills are full of wild fruit. Fremont county boasts a real and personal property of two and a half millions, which is destined to rapidly increase.

GILPIN county is the smallest political subdivision of the State, but one of the most important, and embraces within its limits the richest gold-mining region in the Rocky Mountains, and perhaps in the world. Broken by mountain-ranges and their intervening gulches and chasms, it is rich in the precious metal. Its mountains are covered with forests of pine, and its rugged ravines hide rippling waterfalls and grass-covered bottoms.

Central City, Black Hawk, Nevada, and Rollinsville are the principal towns, the two first being surrounded and traversed by belts of gold-mines, while in the immediate vicinity are gulch- and placer-diggings

lion bushels of wheat, and about the same quantity of oats, barley, rye, corn, and potatoes, are raised.

South of Denver the main producing valleys are the Fontaine-qui-Bouille, Arkansas, Las Animas, and Rio Grande. In these not so much progress has been made in turning their countless acres into cultivated fields and gardens; but attention of late has been attracted to this part of the State, and the next few years will see a rapid progress in the development of Southern Colorado, not only in agriculture, but in horticulture.

The price of land and water combined averages twenty dollars per acre in the north, but there are thousands upon thousands of acres to be had at nominal prices in the south; and to these the coming farmers must go to lay the firm foundations of future prosperity for themselves, their posterity, and the State.

The cost of raising general crops under a system of irrigation is supposed, by those not familiar with it, to be very expensive. But this is not really so, as the experience of Colorado farmers goes to prove. Wheat can be raised at 40 cents per bushel, or $8 per acre; taking the low average of yield to be but twenty bushels per acre, at $1 per bushel, it leaves a profit of $12 to the acre. Oats can be raised at an expense of $10 per acre, leaving the profit $12.50. Corn can be raised for $6.75, leaving a margin of profit of $14.75. Potatoes can be grown at a cost of $20, and in average seasons give $60 profit to the acre. Amber cane can be raised at an expense about equal to corn, but yielding a return of $20 per acre. It will easily be seen that in these figures, based upon actual itemized accounts kept during the season of 1879, there is a good margin of profit; and while there may be seasons when scant snowfalls in the winter on the mountains give short supply of water in the summer, or untimely frost or grasshopper visitation may occasionally curtail the harvest, yet these are less frequent than the violent storms, the severe drouths, and the destructive insects that visit the fields of Eastern and Southern farmers. There is nothing to discourage the cultivators of the soil in the peculiar conditions that are required to make the harvest in Colorado a sure and profitable one. There is abundant room for thousands of them, still open at figures within reach of the poorest; for even if one comes almost penniless, he can still find land offered him for the occupancy thereof by government; and though it may not be a wise policy for individuals to go too far from settled communities, still small colonies can combine their capital, co-operate in building canals, and so create settlements that will eventually grow into thriving towns. Not one-tenth part of the land susceptible of cultivation has been placed under canals, and of this not one-third is occupied. Every variety of grain and all kinds of vegetables can be grown profitably, and the yield is enormous compared with that of the older States. The soil seems inexhaustible in the constituents of cereal crops. Wheat has been raised running eighty bushels to the acre, while the average can be set down at twenty-five. Barley is a sure crop, with a ready market for the grain on account of its superior malting qualities. The yield is from twenty-five to forty bushels to the acre. Oats are easily grown, and yield about the same as barley, while the supply has never yet been equal to the demand, and Kansas and Nebraska are largely drawn upon for the deficiency. Corn is beginning to be considered a staple crop, though at first it was supposed the general altitude of the country, and the consequent coolness of the nights, formed a hinderance to success. But late years have proved that there can be as good corn raised here as in any of the Northern States. Especially is this so in Southern Colorado. Amber cane has been found to be peculiarly adapted to the soil, and a cane is grown rich in the qualities that produce good syrup and sugar. Rye is but little raised, but more attention is being paid to it each year. Potatoes, especially in the foot-hills and on the Divide, yield immense crops. Many of the uplands, especially on the north side of the Cache-la-Poudre, are also suited to the successful cultivation of this tuber. As for vegetables, all kinds, down to the tenderest, are grown with remarkable success.

While agriculture is an established success, it is being conclusively shown that horticulture will yet become a prominent pursuit in the State. Strawberries are one of the most certain and profitable of crops. One acre can be cultivated and the crop marketed at a cost of $150, while the profit from 1800 quarts at 25 cents per quart—which was the wholesale rate during the summer of 1879 in the Denver market—leaves a profit of $300 per acre. Blackberries, raspberries, currants, and gooseberries range from 20 to 50 cents per quart at wholesale, while the expense of cultivation is perhaps one-third less than for strawberries. Grapes grow in great abundance, and tons of them are annually put upon the market and find ready sale. Peaches, pears, and cherries are grown in various localities in sheltered locations, and it would seem as though—in Southern Colorado, at least—these fruits would yet be successfully cultivated to a limited extent. Apples of the more hardy varieties are now raised in both sections of the State. One orchard yielded two thousand bushels last season; it is located in the Arkansas Valley, near the town of Cañon City. Of course there have been many failures in the past, and will be in the future, in these pursuits, until time and experience determine the varieties suited to the peculiar climate. But such discouragements have been met with elsewhere, and in States that are now recognized as great fruit-growing States. Colorado horticulturists have no cause to be discouraged.

The general outlook for agriculture and horticulture, therefore, may be said to be good, though they cannot be expected to keep pace with the mining progress; but this fact is in the farmer's favor, not against him. The building of extensive irrigating-canals, the economical use of water, the introduction of all the improved kinds of machinery, the intelligent system of cultivation, the sure cash-market that exists, and the inexhaustible richness of the soil,—these are safe warrants for the assertion that "Colorado agriculture is sure to be remunerative, as well as ennobling, to all who pursue it, and who bring to it that intelligence, industry, economy, and perseverance which is demanded for success in other avocations of life."

CATTLE—SHEEP—DAIRYING.

The rapid increase and general prosperity of the stock interest of the State confirm its character of peculiar attractiveness and adaptability for the successful pursuit of this and kindred industries. The mildness of its climate and the nutritious character of its native grasses not only tend to the highest development and perfection of breeds, but enable the stock-owner to meet the expense of long transportation and compete in the markets of Chicago and New York with cattle-growing regions more accessible to market, but less favored in conditions of climate and vast extent of native and inexpensive pasturage. With the advantages which these two conditions of climate and food so abundantly offer, stock-raising is destined to continue to be a leading—in fact, the second great—industry of Colorado, and a prominent element in its wealth.

The grazing-grounds of the State extend from its eastern borders to the line where farming begins—say, a strip twenty miles wide from the base of the foot-hills. From the Arkansas to the Platte, and along the streams which are tributary to these rivers, on the head-waters of the Republican, and in fact wherever upon the Plains water can be found in sufficient quantities for stock, there is probably an area of forty thousand square miles where cattle, sheep, and horses can range, feeding upon nutritious grasses, and costing their owners a nominal sum only for herding or the expense of the annual "round-up." The yearly losses are very small from storms, exposures, and other causes, and do not exceed five per cent.

It is supposed, especially by those engaged in the business, that there are enough cattle and sheep in Colorado for the land that is open to sustain them. But this is an erroneous impression, calculated to injure the growth of this important element of wealth. There are still immense areas of pasturage, especially in the southern and south-western portions of the country, where cattle can be kept and where sheep can be made a source of immense revenue. These lands for a long time to come are not likely to be made available for agriculture, and consequently can be used for grazing purposes.

The very great profit there is in cattle and sheep lies in the important item of free feeding, and is likely to continue to be the source from which their owners will draw princely revenues for many years to come. A movement was lately inaugurated by the Stock-Growers' Association of Southern Colorado to memorialize Congress on the subject of offering for sale these so-called arid lands at a graduated price per acre, by which extensive tracts which are only suitable for grazing purposes might be purchased at a low valuation, believing that such a course would add to the taxable wealth of the State, while it would be of material service in building up the permanent stock interest. But it is a question if the passage of such a law would not result in the establishment of a few immense ranches, to the exclusion of the large proportion of small cattle-growers now holding the ground by the right of occupancy.

The grasses on the Plains are mainly of three kinds: the gamma-grass, growing about ten inches high, in a single round stock, with two oblong heads at the top of it; then comes the buffalo-grass, growing about four inches high, which is curly in its character and lies close to the ground; then there is what is called bunch-grass, which keeps green at the roots nearly all winter. On these cattle and sheep subsist the year round, and grow fat.

The five leading counties of the State wherein cattle predominate are Weld and Arapahoe in Northern, and Bent, Elbert, and Pueblo in Southern Colorado. The number returned last year was 502,293.

The counties returning the largest number of sheep are Weld, Larimer, and Arapahoe in the north, and El Paso, Huerfano, Las Animas, Conejos, Bent, and Pueblo in the south. The number returned last year was 779,991.

But few horses, comparatively, are raised in the State, 61,506 being reported altogether; the five counties having the largest number are Weld, Arapahoe, El Paso, Larimer, and Boulder.

The assessment returns of live-stock for some counties are believed to be far too low to give any correct idea of the extent of this industry. It is believed by competent judges that there are nearly nine hundred thousand head of cattle and two million sheep in the State, and that the total value of the live-stock upon the range will foot up $15,000,000.

The shipment of cattle out of the State has reached over one hundred thousand head yearly, and at an average price of twenty-five dollars per head it will be seen that Colorado realizes no inconsiderable income from this source, it footing up two million five hundred thousand dollars, while the amount realized from the sale of tallow and hides and the dairy products adds one million more to these figures. The quality of cattle is constantly improving, there having been introduced within the last few years a large number of short-horns, Herefords, Jerseys, and Devons.

A State Board of Cattle Inspection Commissioners is provided for by statute. There are two State Stock Associations, holding annual sessions. In the spring occurs the "round-up," when all the cattle spread over the various grazing-tracts of country are driven together in one vast herd, and, with their increase, separated and driven to their respective ranges by their various owners. These "round-ups" cover sixteen districts, and are governed by well-established rules and regulations.

The growth of the sheep interest has been uniform and rapid. Ten years ago there were not twenty thousand in the State; now there are two million, and the industry is increasing each year both in quantity and (by the introduction of thoroughbred Merinos) quality. The wool-clip of last year was over 5,500,000 pounds, valued at $1,400,000.

Sheep-raising is very profitable. The estimates of outlay and profit on sheep-farming for three years can be easily given from the actual experience of those engaged in the business:

Outlay.—One thousand sheep, twenty rams, wagon-team, harness, ranche, house, corral, herders' wages, and provisions:

First year, $4660; second year, $1225; third year, $2050; total, $7935.

Profits.—From the wool:

First year, $1790; second year, $2710; third year, $3940; total, $8640.

It will be seen, therefore, that the proceeds from the sale of wool more than cover the first cost of the sheep and the herding outfit and expenses, leaving a balance in favor of the raiser of $705. At the end of the three years he has therefore his entire flock in hand, numbering 4200, free of cost. The value of these may be set down at $2.50 per head, or $10,000, while his ranche, corral, and team, worth about $1000, are still to be taken into consideration. This shows a profit of over two hundred per cent. upon his original investment, and the next two or three years the ratio of percentage will increase.

One man can attend to from one thousand to two thousand sheep with ease, except at lambing-time, when the services of two men are required for one month. Those who intend to enter this business, however, are advised to go cautiously at first. Learn the ways of the country and the methods of caring for sheep requisite for success by engaging with those who have had experience for at least one season. The knowledge thus gained will be of incalculable value. A careful selection of land for a range is necessary; some sheep-men have two ranges—one for summer, on the plains, and one for winter, within the shelter of the foot-hills. Good sheep in the start pay better than a poor grade. A close attention to business will enable even those who are novices at it to build up a respectable fortune in a very few years by sheep-raising.

In this connection a few words about dairying may not be out of place. For this industry Colorado presents many excellent advantages. The native grass is rich and nutritious; the water is pure, abundant, and cold; the soil produces in greatest profusion all kinds of roots adapted for winter-feed for new milch cows. All these are items which the dairy-farmer will readily recognize as important factors in an industry for the products of which there is a constant home-market, where butter brings a good price. The demand for this article has always been greater than the supply, the price ranging from twenty-five to forty-five cents.

We give in this connection a demonstration of what dairymen can do in Colorado, and of the profit there is in the business, from figures kept by one engaged in it:

Twenty cows from January 1st to December 1st yielded 2640 pounds of butter, or an average of 132 pounds to the cow, which, selling at 30 cents—a low average price—gave a total of $792, or an average of $39.60 per cow for the season. In addition, the calves brought $5 each, making the total from each cow $45.60. The expenses figured up as follows: help, $300; salt, $20; hay, $80; bran and feed, $20; total, $420—leaving a balance of $372 profit at the end of the season, or $18.60 per cow.

There are excellent locations for dairying on the Divide south of Denver and within the first range of mountains, from ten to twenty miles from the Plains. These localities are small valleys or parks, varying in size from twenty to two hundred acres, surrounded by mountains, full of beautiful streams of water. Pine, cottonwood, and willows furnish timber and shade, while in the valleys considerable hay can be cut and stored for winter use. Here the grass is rich and sweet, even far up the mountain-slopes, and usually so little snow falls that pasturage can be had almost every day in the year. Some of these parks are immediately connected with others, making a series of valleys where a few families form a pleasant neighborhood and live in rural quiet and prosperity

TOWNS AND VILLAGES.

The cities of Denver and Leadville being described under separate headings, we now group together brief descriptive sketches of some of the other principal towns and villages of the State, following the lines of railway:

GOLDEN is the county-seat of Jefferson county and the point of junction of the broad- and narrow-gauge divisions of the Colorado Central Railroad; population, about 3000. This is a manufacturing and coal-mining centre, and is one of the oldest and most prosperous of the cities of Colorado. It was founded in 1859 by gulch-miners, and was at one time the rival of Denver and the capital of the State. It lies on Clear Creek, where a rapid stream, with a fall of sixty feet to the mile, gives the town an immense water-power. Extensive smelting-works have been erected in the valley adjoining the town, and the advantages for manufacturing industries at this point are numerous. Golden is fifteen miles west of Denver, and has an elevation of 5882 feet. The State School of Mines is located here. Two weekly journals, the *Transcript* and *Globe*, are published. Its location is somewhat remarkable for its surroundings, being hemmed in on all sides by mountains, except at the opening made by the debouching of Clear Creek from the foot-hills on its way to the Plains.

IDAHO SPRINGS is a point of interest as a popular summer resort, where the hot springs annually attract a large number of invalids, while the beauty of the cañon draws thither tourists from all directions. The springs vary in temperature from 60° to 110°. The *Iris*, an excellent local journal, is published weekly.

GEORGETOWN is the principal town and the county-seat of Clear Creek county, lying at the very base of the Main Range. It was founded in 1860, is surrounded by lofty mountains ribbed with silver-veins, and has a population of 2500. It boasts of waterworks, a fire department, five churches, two newspapers—the *Miner* and the *Courier*—two banks, and business-houses equal to any town of its size in the State. There are reduction-works, concentrating-mills, sampling and ore-buying establishments, all in active operation. Mining is carried on very extensively in the immediate neighborhood. Near by lies the celebrated Green Lake, a very attractive spot for tourists and sportsmen, while Gray's and Irving's Peaks tower above it. The elevation of the town is 8452 feet.

Black Hawk was first settled as a mining-camp in 1859, and the present town is built irregularly along the gulches and against the mountain-sides. Its appearance, therefore, as viewed from one of the adjoining hills, is very peculiar. The principal industries of the place are gold-mining and milling and reducing ores. Some of the oldest and best-developed gold- and silver-mines of the State are in the immediate vicinity, making Black Hawk a busy, prosperous town of about 1000 inhabitants. It has one weekly journal, the *Post*. Altitude, 7955 feet.

Central City is the business-centre of the gold-mining districts of Gilpin county, its principal city and the county-seat. The streets are narrow, steep, and rugged, the result of the peculiar conformation of the ground; they run on each side of the gulches and on the slopes of the surrounding mountains. It is a terminus of the narrow-gauge system of the Colorado branch of the Union Pacific Railroad, Georgetown being the other, has a population of 2000, and supports an excellent daily paper, the *Register-Call*. Distance from Denver, 40 miles.

Louisville.—From Golden the broad-gauge track extends northward, passing the town of Louisville, built within the last two years. In its neighborhood is the Welch mine, yielding the best coal found in Northern Colorado, and giving employment to a large number of people. Population, 500.

Boulder is the principal town and the county-seat of Boulder county, and is located in a beautiful valley close to the foot-hills. In earlier years it was the head-quarters of an extensive mining district, and is still prominent in this respect. Its site and surroundings, its manufacturing advantages, the mineral and agricultural wealth of the county, will yet place Boulder in the front rank of thriving cities. Its coal-mines are no unimportant factor in its elements of prosperity. Boulder Cañon (described elsewhere) is unexcelled in the State for the weird grandeur of its scenery. The State University is located here. There are two banks, six churches, three newspapers, and an excellent graded school employing eight teachers. Population, about 2000. Elevation, 5536 feet.

Longmont.—Continuing along the line of the railway, fourteen miles north of Boulder we come to the town of Longmont, located in the very centre of the agricultural portion of Northern Colorado. It is not a large town, but it is an exceedingly prosperous one, being surrounded on all sides for a distance of from seven to twelve miles with cultivated farms. It was settled by a colony in 1872, and relies entirely for its business upon its agricultural surroundings. Lying on the north bank of the St. Vrain, it has a beautiful location, with Long's Peak, from which it was named, looming in the distance. The road to Estes Peak, now attracting attention as a summer resort, is from this point. When a system of waterworks, now projected, is established, Longmont will become one of the most pleasant country towns in the State.

LOVELAND lies seventeen miles north, on the bank of the Big Thompson. This town is of recent growth, but bids fair to be the centre of a thriving and industrious farming community.

FORT COLLINS is the county-seat of Larimer county, and, located as it is near the foot-hills, obtains, in addition to the trade of the extensive farming settlements lying all around it, the entire trade of the mountain-districts directly west of it. The road to North Park leads from this point. The State Agricultural College is located on 240 acres of land just south of the town. A splendid brick schoolhouse marks the intelligence of the community. Within the last year or two the town has grown rapidly, and bids fair to become the largest in that section.

GREELEY is a town known all over the Union as the one founded by Horace Greeley, in connection with N. C. Meeker, in 1870, at which time several hundred families left the Eastern States to establish in the West a temperance settlement. At first, many things conspired to discourage the colonists, and perhaps four-fifths of the original ones left the place and country in disgust. But now, ten years after its settlement, a thriving town of 2000 inhabitants attests the wisdom of its founders. The streets are of generous breadth, lined with shade trees. The inhabitants are, as a class, very intelligent. A magnificent school-building was erected six years ago. A canal about forty miles long furnishes water for sixty thousand acres of land enclosed in a common fence. Farming in this neighborhood is the occupation of three-fourths of the people, and the wheat-crop raised each year is about one-fifth of what is raised in the State. Two banks, two newspapers, and churches of all denominations are here and thriving, indicating that the society is of the best in the State. The science of farming is better understood and practised here than anywhere else in Colorado. Greeley is on the line of the Denver Pacific Railway, fifty miles south of Cheyenne.

EVANS lies south of Greeley, four miles away. It is on the north side of the South Platte River, and boasts an enterprising and thrifty community. Considerable farming is done on the lands lying south of the stream, but there is room for more, as water is abundant. A colony settled here in 1872, and though not as successful as some others, still the result is gratifying, as there is a pleasant little settlement of perhaps 500 people, with a newspaper, schools, churches, flouring-mill, and stores of all kinds.

ERIE is a coal-mining town in the centre of the coal-producing districts, and is reached by the Boulder Valley Railroad, branching off at Brighton, a station on the Denver Pacific. There are five extensive coal-banks in the neighborhood, giving employment to a large number of men. Some farming is done in the vicinity. Population, about 500.

PLATTEVILLE was originally founded by the Platte River Colony in 1873, but has not developed much. It is pleasantly located, however, and surrounded by excellent agricultural land. It has a population of 200. It is a station on the Denver Pacific, about 35 miles from Denver.

LITTLETON is the first principal station on the Denver and Rio Grande Railway, and is 10 miles south of Denver. Pleasantly located on the east bank of the Platte River, it will eventually become a prosperous suburb of the capital, as both the Denver and Rio Grande and the Denver and South Park Railways pass by it.

CASTLE ROCK is the county-seat of Douglas county, and is beginning to be famous for its excellent building-stone, which is extensively used in Denver and elsewhere. It has not a very large population; settlements in the vicinity are scattered, but still it supports a newspaper, school, churches, and a number of stores.

MONUMENT lies about 20 miles north of Colorado Springs, just over the crest of the Divide, and is the centre of a rapidly-growing district. It draws the trade of a section of country stretching east over twenty miles, where farming can be carried on without irrigation. There is also a good dairying district in the neighborhood, for, though streams are few and scanty, yet an abundance of springs that never run dry give it an advantage in this respect over other portions of the State.

COLORADO SPRINGS is the Saratoga of the West. Founded in 1871 under the auspices of the railway company, it soon came into prominence as a favorite resort for invalids, while its close proximity to Monument Park, the Garden of the Gods, Glen Eyrie, Manitou, Pike's Peak, Cheyenne Cañon, and other attractive points soon made it a place toward which tourists from all parts of the East tended. The streets and avenues are broad, and lined with trees of uniform size planted by the town company in the early days of its organization; these have now grown to a large size, and make the city look like a forest during the summer season. Outside of Denver, it has the handsomest residences of any town in the State, and is attracting to it the wealthy and influential classes to such a degree that it bids fair to become, socially and intellectually, the most desirable residence-city in Colorado. Waterworks and gasworks give quite a metropolitan *tone* to it. Business is good, and constantly increasing in volume. The population is set down at 5000, but it is difficult to establish it definitely, as it has, and always will have, a shifting population, drawn to it by the natural advantages of the town for invalids and pleasure-seekers. An irrigating-canal supplies extensive tracts of land with water for gardening purposes, but no large breadths of farming-lands can ever be cultivated in the immediate vicinity, as the waters of the Fontaine-qui-Bouille are not of sufficient volume to warrant the construction of any large canal. An excellent daily journal, the *Gazette*, is published here, and one weekly. Colorado College, a Congregational institution, is located here, and has been liberally endowed. A stone schoolhouse was early erected, but three buildings are now required for the educational needs of the residents. The State Deaf and Dumb Institution is located just east of the town, on rising ground commanding a beautiful view of the mountains. Colorado Springs can be considered the third city in size in the State, but in proportion to its population it does not fall behind Denver in social position.

PUEBLO, the principal town and the county-seat of Pueblo county, is located in the valley of the Arkansas, near the confluence of that stream with the Fontaine-qui-Bouille. It is surrounded with good grazing-lands and many hundred square miles of fertile agricultural land, but the uncertainty of the current and the shifting sands that constantly wash into it make large canals somewhat expensive to keep in good working order. Originally, Pueblo was quite a distributing-point for the South and West, and a rendezvous for the various stage-lines running in these directions; but the advent of the railroads changed these, and it is now something of a railway-town, it being the terminus of the Atchison, Topeka, and Santa Fé and a highway for the Denver and Rio Grande, which latter also has a branch road running from it to Cañon City, 35 miles west. An excellent daily newspaper is published here, also a weekly; the town is well supplied with schools, churches, public buildings, and is the seat of the Insane Asylum of the State.

CAÑON CITY is the county-seat of Fremont county, and boasts a population of 1200, with banks, newspaper, churches, and schools. The State Penitentiary is located here, built of granite quarried from the adjoining hills. The town is located just where the Arkansas leaves the foot-hills, boasts of mineral springs, both hot and cold, and undeniably possesses some superior natural advantages. There are some singularly beautiful cañons near by, while the Royal Gorge is but a few miles distant, and is soon to be traversed by the iron horse as it steams *en route* to the great carbonate city of Leadville. (These cañons are mentioned elsewhere.) Near Cañon City considerable attention has been paid to fruit-culture, and the results have been gratifying in the extreme. Between Cañon City and Pueblo, a distance of 35 miles, some farming is carried on. The city has advantages that cannot fail to ensure it a prosperous growth.

TRINIDAD.—This town is situated near the base of a spur of the Rocky Mountains, a few miles from Raton Peak; it lies on the Las Animas River, a stream whose valley, about 150 miles in length, embraces some of the most fertile lands in Colorado. Inexhaustible beds of coal are in the immediate vicinity, and hundreds of ovens are engaged in making coke, the demand for which is greater than can be supplied. Copper and iron ores have been discovered in the neighborhood, while the plains east of the town are covered with cattle. In fact, Las Animas county, of which it is the seat, is fast coming to the front as the leading stock-county of the State. The town has had the New Mexican trade to a large extent of late years. Perhaps one-quarter of the people are Mexicans in a population of 2000. The Atchison, Topeka, and Santa Fé road reaches the town from the east, and the Denver and Rio Grande from the north. Its growth within the last few years has been very rapid and healthy, and Trinidad, though almost on the southern line of the boundary of the State, being only 14 miles from the New Mexican line, has a promising future before it. The Raton Pass, aptly denominated the gateway to New Mexico, is but 15 miles from the town. It supports two daily newspapers, schools, churches, and other adjuncts of civilized society.

BUENA VISTA was founded only last year, but its peculiar location has already brought it into prominence, and it seems likely to be a thriving town. It rests in the delta formed by Cottonwood Creek at its junction with the Arkansas River, and the site is pronounced to be one of the finest in the State. Its nearness to Leadville, being only about 35 miles from that city, makes it a place where the business-men of that populous but unhealthy city could easily reside, now that railroad communication is to be established between the two places. Near by are the famous Cottonwood Springs, becoming known as a resort for invalids troubled with rheumatism. There is said to be a large body of land suitable for agricultural purposes in the neighborhood, but the town is more likely to become celebrated as a great watering-place, and may yet rival Colorado Springs in attractions.

thousand square miles. Evidences of a once thickly-inhabited country abound throughout its entire length. At some time in the distant past a pre-historic race of people existed in the fastnesses of the south-western portion of Colorado, whose life and history are only hinted at in the vast accumulations of remains that are left behind them. Of the habits of these people we know but little. The general absence of human remains, and the fact that few if any burial-places have been uncovered, would seem to indicate that other methods than those used in our day to hide the remains of the dead were practised. Indeed, the heaps of ashes mingled with charred wood lead us to believe that cremation was not an unknown art with them. As to the era in which this extinct race existed, there is no positive data. The towns are now as they were hundreds of years ago, for these ruins were seen and described by Spanish explorers, who accounted them Aztec ruins. It may be that time and more extended research may open up the story of the people who once flourished—as did the Egyptians of old in all their grandeur upon the banks of the Nile—among the cliffs of Colorado, but who have been swept away from their rock-hewn castles on the cliff-sides and their valley-towns, leaving nothing behind to tell the story of the ages in which they flourished. It would seem as though these ruins would indicate races of ancient culture flourishing here thousands of years ago, and that America may yet be established to be the Old instead of the New World.

In this vast area of land—still far away from civilization, but into which the feet of the tourist will in a few short years wander, while the hearts of the beholders will be hushed with awe and their eyes grow round with wonder—will be found new fields of study and research that will be more puzzling than the secrets of the Nile have ever been. The Dolores, San Juan, Mancos, La Plata, De los Pinos, De los Animas, De Chelley,—these will be Meccas for the geologists, archæologists, ethnologists, who will find, in unfolding the secrets of the cliffs, full occupation for their skill. Then, perhaps, the hieroglyphics upon the walls will tell a story at which a civilized world will wonder.

As to the causes that destroyed such an immense nation as evidently once inhabited this country, we can only conjecture. It is among the possibilities that they were once similar to the people who inhabited the valleys of the Mississippi and Missouri, and who were driven westward by the ancestors of the present race of savages still lingering in our midst, and that they were eventually destroyed in their mountain-fastnesses by these and the Spaniards of earlier days. The present Pueblo Indians are supposed to be a remnant of the ancient race of Cliff-dwellers.

AGRICULTURE.

Agriculture in Colorado is an entirely different pursuit from that practised in the East, and the farmer who comes to the State and enters upon the cultivation of the soil in the style he has been accustomed to, will find that failure is more likely to crown his endeavors than success. He has much to unlearn. It is best to abandon old notions and begin anew. Dependent upon irrigation for the growth of his crops, he must study the methods and meet the requirements of the climate. With a fixed purpose in his mind to overcome all the obstacles that will daily present themselves to him, it will not be long before the new order of things will become familiar, and, once understanding the methods, he may rely upon Nature for the rest. Bountiful harvests will crown his efforts, and excellent prices will cheer his heart and fill his pocket. Irrigation is dreaded because it is not understood. Yet it is almost as old as civilization, and Oriental countries have depended upon it for uncounted ages. The records of ancient history are full of it, and to-day in India, China, and elsewhere in Asia long and expensive irrigating-canals are the reliance of millions to whom a failure of water would be starvation and death.

In the early history of Colorado small ditches by individuals were constructed, covering only the meadow- or bottom-lands. But the selection of Union Colony (in 1870) of Colorado for the settlement of a new town caused the construction of the first large canal to cover the plains proper, or uplands, running several miles back from the stream. This successful enterprise was followed by others of like corporate nature, and now a large amount of English capital is being spent in the construction of canals covering from thirty thousand to seventy-five thousand acres of land. An immense impetus has been given to the agricultural development of the country by these companies, and the rapid increase of population keeps up a demand that the farmers are not able to supply, neither will they be for a number of years. Hence good prices will be the rule, while bad seasons are the exception, in the experience of farmers.

The agriculture of the State is confined to the valleys, of which we mention the principal: The Cache-la-Poudre, a valley thirty-five miles long, with an abundant supply of water; the Big and Little Thompson, the St. Vrain, Left-Hand, and Boulder, in Boulder county; Ralston, Clear Creek, and South Platte. These are the principal agricultural valleys in Northern Colorado, and here two-thirds of the grain and vegetables of the State are raised. Something like three-quarters of a mil-

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ley. Two daily papers are already published here, and the fame of the mines is likely to make the town one of the most important among the many that are rising into prominence in the mineral-bearing sections of the State. It is 30 miles from Cañon City, with which point it makes daily connection by coach. Mills of various kinds have been erected, and the undoubted richness of the mines in the vicinity will ensure a steady development of business.

LAKE CITY is the county-seat of Hinsdale, and the principal town in it. It is one of the most promising towns in the San Juan country. At present it does not control the trade it had in 1876 and 1877, before the discovery of carbonates, at which time it was the distributing-point for the Sierra country, as San Juan was called; but it can look forward encouragingly to the future, when attention will be again drawn to the inexhaustible fissure-veins that rib the mountains and indicate the untold wealth that lies in them. It is surrounded by these, and has a situation bordering on the wildly picturesque.

DEL NORTE.—This town lies along the banks of the Rio Grande River, and is the county-seat of Rio Grande county and the entranceway to the mines of San Juan. The gold-mining excitement of 1874 created it, and it has now a population of about 1200, sustains a bank, a weekly journal, churches, schools, many large stores and warehouses. It is 34 miles from railway communication, its nearest point being Alamosa. While not at present presenting any prominence among the towns of the State, it may be said to enjoy a present fair share of prosperity, with an assured future before it when the San Juan mines are worked.

LEADVILLE AND THE ADJACENT CAMPS.

Three years ago Leadville had no existence. It is now a city of giant proportions, and challenges the world to produce its superior in all that embodies the features of present wealth and future greatness. It lies under the deep shadows of the continental Divide, a very Golconda of riches within the hills that encircle it, clothed with the majesty of a metropolis, and inhabited by a people active in all the industries connected with professional and commercial life.

To a newcomer, this city, the creation of three years, presents a fresh and startling aspect when compared with the old-established cities whose position is the result of decades of growth. Fifty thousand people where but a short time ago there were not fifty is an indication of the strength of that thirst for gold that first sent Coronado in search of the Seven Cities of Cibola in the country to the south of the Carbonate Camp, and that has in our day gathered together the people of all nations and countries, all professions and trades, of all ages and conditions. The reported richness of the camp took them in by hundreds daily last year in all manner of conveyances and by Nature's own method of transportation. Many sought for wealth in a day, and, finding it not, left for other fields. But those who remained in more or less measure of success have had their persistence crowned with the reward of well-doing. Hardly a week passes, even now, without heralding the discovery of new mines of fabulous value, while the possibilities of the future are almost sufficient to turn the brain of the most clear and cool-headed of mankind. One hundred and seventy-five producing mines, and thousands more possessing good prospects, are a base of calculation for the growth of Leadville that no other place in history has ever presented.

The man who put up the first shop in the town, on Chestnut street, refused to give one hundred dollars for it when the owner of the lot on which the shop stood demanded that amount. Within ninety days he saw the same lot sold for three thousand dollars. Hundreds, like him, have hesitated, and lost small fortunes by their hesitation. High as are the figures asked now for business and residence lots in choice locations, these prices are more likely to advance than recede. But the era of wild speculation has passed away, and real-estate transactions are on a solid basis. Fortunes are yet to be made, but capital will be required in larger amounts than heretofore.

The climate of Leadville cannot be said to be one conducive to the restoration or preservation of health. It is in a region of altitude where vegetation is limited, the air of an extreme rarity and full of the deleterious vapors from a score or more of smelting and other works located in the very heart of the city. The prevailing diseases are pneumonia, pleurisy, diphtheria, cardiac affections, erysipelas, and bronchitis. Acute rheumatism also prevails, while lead-poisoning is frequent among those employed in the smelting-works. The sanitary condition of the city is yet imperfect, and prejudicial to health. There is no system of sewerage, and the emanations from the smelting-works fill the atmosphere with sulphurous fumes and carbonic-acid gases. A great deal of sickness, however, is the result of exposure and imprudence or ignorance on the part of newcomers. The sudden entrance into a higher altitude always affects those who are not acclimated. Care must be taken to guard the body against the sudden changes of the weather. Heavy woollen under-garments are an absolute necessity in summer as well as winter, as the setting of the sun is always followed by a marked change in the thermometer. All exposures and imprudences are to be avoided, and what might at a lower altitude be a simple cold, not needing any care or attention, in Leadville will speedily develop into a serious case unless promptly attended to. It does not get well of itself, as elsewhere. A proper sanitary provision will ultimately remedy some of the evils here mentioned: a careful attention to hygienic laws on the part of those who reside there will tend to decrease the number of cases of sickness, and the time may come when Leadville will enjoy what it certainly does not do now—a good reputation as a healthy city.

The altitude is ten thousand two hundred feet above the level of the sea, and the city is located on a broad plateau of land sloping toward the Arkansas Valley, and is surrounded by towering mountain-ranges. Its supply of water is brought from a distance by means of ditches and pipes, while an immense reservoir has been built near by to hold a reserve. The water is pure, wholesome, ample, and never-failing. The winters are severe and long, while even in summer the nights are cold. Hotel accommodations range from one to four dollars per day. Board in private houses is ten dollars per week. Rents are high, close to business-streets averaging twenty dollars per month for a single room, running down to five dollars on streets a few blocks away. There are some buildings yielding in two months' rent what it cost to build them. Lumber is mostly used for building purposes. Native costs $30 per thousand feet; Chicago A stock, $125; Chicago siding, $50; shingles, $7; doors and sash, from $2.50 to $5. Brick is scarce, bringing $20 per 1000.

The most successful prospectors are those who know comparatively little about minerals. Pluck, perseverance, and a pick are the three requisites to success, supplemented by pork and provender. The time has gone by when men with small capital can enter into business successfully in Leadville. There are no Chinese; they were once introduced into the gulch, but immediately notified to leave, and since then have not ventured to intrude. The articles needed by a prospector depend upon his bringing-up and the length of his purse. As one has said, "If he is well fixed" he may buy a burro for $25, and on the back of the diminutive beast pack his tent, pick, shovel, sack of flour, side of bacon, blankets, frying-pan, coffee-pot, sugar, coffee, and baking-powder, and start off on his venture, comparatively "well fixed." A Sharp's rifle is a handy thing to have—not because there is anything or anybody to fear, but elk, antelope, and Utes are to be met with, and are excellent—when dead. Men looking for soft positions as clerks and bookkeepers are not wanted. Wages of carpenters, bricklayers, miners, and laborers range from five to two dollars per day. The working or building season is from May to October. The town is full of professional men, but here, as elsewhere, "there is always room at the top." Insurance rates rule high on account of the buildings being mostly of wood.

The cost of living may be estimated from the following figures; of course there is a constant fluctuation, according to the season and the abundance of stocks in the market, but a good idea can be had from the prices given: Flour, $6.75 per 100 pounds; potatoes, 6 cents a pound; sugar, 15; lard, 15; coffee, 30; hams, 15; bacon, 15; tea, 50 cents to $1; salt, 5 cents; syrup, $1.50 per gallon; vinegar, 75 cents; coal oil, $1; candles, 25 cents a pound; corn meal, 5 cents; Graham flour, 6; raisins, 20; codfish, 12; mackerel, 10; dried fruits, from 10 to 45; beans, 8; barley, 12; hominy, 10; crackers, 12; butter, 40 to 50; cheese, 25; soap, 8; eggs, 45 cents a dozen; poultry, 25 cents a pound; oat meal, 8; mincemeat, 20; dried beef, 20; white fish and mackerel, $2 per kitt; buckwheat flour, 10 cents a pound; New Orleans molasses, $1.25 a gallon; canned goods, from 25 to 75 cents a can; beef, 15 cents a pound; mutton, 15; pork, 20; wild meats in their season, 20; prairie-chickens and grouse, 60 to 75 cents a pair; quail, 50 cents a pair; trout, 60 cents a pound; lake and sea fish, 35 to 60.

A trade-report of over twenty million dollars in a city but three years old, with a certainty that even this enormous amount does not include the whole of the business, presents a statement challenging comparison with any Eastern city of three times its size. We group together the different branches of trade as proof positive of the marvellous enterprise displayed by its business-men and of the activity exhibited in a city built ten thousand feet above sea-level. If no other evidence was at hand of the number of people in and about Leadville, the fact that their necessities demanded such a wave of business would be amply sufficient: Assaying, $45,000; auction, $260,000; barber-shops, $40,000; bakers and confectioners, $310,000; books and stationery, $75,000; bath-houses, $35,000; blacksmiths, $900,000; boots and shoes, $165,000; clothing, $650,000; cigars and tobacco, $100,000; dry goods, $1,100,000; drugs, $235,000; fruits, $25,000; furniture, $175,000; glass and queensware, $25,000; groceries and provisions, $3,500,000; hats and furs, $45,000; harness and saddles, $30,000; hardware, $750,000; hay, flour, feed, and grain, $850,000; hotels, $450,000; jewelry, $210,000; lumber, $750,000; livery and sales stables, $500,000; millinery and dressmaking, $75,000; meat and vegetables, $600,000; manufactures, $400,000; tailors, $30,000; commissions on mining and real estate, $600,000; news dépôts, $35,000;

oysters, fish, game, and eggs, $40,000; plumbing, $75,000; painting and papering, $55,000; restaurants, $550,000; sewing-machines, $10,000; loans, $4,500,000; surveying, $85,000; shingle-mills, $200,000; storage and commissions, $125,000; theatres, $500,000; wood, $60,000; liquors, $885,000. Grand total, $20,120,000. These figures tell their own story. The "boom of business," as it is called, is no way lessening; on the contrary, it is constantly increasing, and the business of the present year will without doubt figure up $30,000,000.

The first public school organized in Leadville was in July, 1877. In the fall of that year a Board of Education was formed and school-terms were established. There is now a high school, two intermediate and four primary schools, and the last census of the district showed 1230 scholars. Nine teachers are employed, whose salaries range from $60 to $125 per month. The school property of the district cost about $10,000. It may be said that the educational interests of the city are in a fair way to be properly taken care of, and that the rising generation will receive all the advantages that a liberal-minded policy can give them. Already school privileges are of a pronounced and healthy character, while there is no doubt that the future will provide all that is necessary to render the system more complete.

Six religious denominations have church buildings—the Presbyterians, Methodists, Christians, Roman Catholics, Congregationalists, and Episcopalians. The pastors of these churches are doing a good and effective work in society, and are upheld by a large moral sentiment outside of their respective organizations.

The Leadville bar compares favorably with that of any city of its size, and has in its ranks men who are distinguished for legal lore and eloquence. Of course these representative men have come from every State in the Union; some have grown gray through long years of study and experience in other fields, and now bring to their new arena of labor the ripe fruits of years of toil. The field, like that in all mining camps, is a lucrative one, on account of unsettled titles and conflicts of claims and interests. Hence, while some mines make their legal owners rich, other mines make the legal advisers of the owners feel that bonanzas are not entirely confined to the glittering soil, but are also hidden in the "glittering generalities" of the law.

Leadville was incorporated as a city in March, 1879, and is run at an expense of nearly five thousand dollars per month. It has a mayor, aldermen, clerk, solicitor, physician, engineer, surveyor, street commissioner, fire-warden, marshal, and twenty policemen. The salaries of these city officials range from $250 per month down to $75. A revenue of nearly $200,000 is derived from licenses and fines, while the expenses are largely under that amount; hence the financial affairs of the corporation may be said to be in a healthy condition. But it is a sad and suggestive comment upon the morals of Leadville that the arrests from which fines are received average two hundred per month, and the great majority of these are traced directly to intemperance. An excellent fire department is in effective service. Time and money were early given toward the organization and support of a fire-service. There are one hook-and-ladder and two hose companies, fully equipped and uniformed. There are fifty-nine hydrants or fireplugs through the streets, having a head or pressure of water sufficient for all practical purposes, while the Gamewell system of fire-alarm telegraph is in active working order. So it will be seen that full provision has been made against the spread of fire.

The mineral fields of Leadville cover many gulches and mountains, and seem to defy all laws of mining deposits. The class is termed carbonates, which is defined by Webster as a salt formed by the union of carbolic acid with a base. In working, the first thing found is the drift, débris, boulders, and gravel that floods and fires have rounded into hills and valleys. These go down a few feet, when a light-colored chalk rock is met with; this is porphyry, and overlies the iron, which is the cap-rock of the ore, and is called the "contact." When iron is reached and carbonates found beneath it, a mine has value, not before; for sometimes no mineral is found beneath the iron. The bed-rock is usually blue limestone of an undulating character, and the ore follows the uncertain course of the wall, and is rich in the depressions and more barren in the elevations. There are two theories extant as to the placement of the carbonates in the position in which they are found. One is, that they were washed into their resting-place; the other, that internal commotion forced the bed-rock and the cap-rock apart, using the carbonates as a lever, where they cooled and remained. The weight of opinion is on the side of the last supposition.

Sixteen extensive establishments smelt the gold and silver output. These have all been built since September, 1878. The entire value of bullion produced by them for the year 1879 reached a grand total of $9,250,000, the four principal smelters producing more than one-half of the above amount. There are two sampling-works where ores are crushed, assayed, and mill-runs made; these do quite an extensive business in buying and shipping ores to foreign smelting companies and base bullion for shipment to the refineries, the value of the ore they ship out figuring over one and a quarter million of dollars. Taking the amount of bullion-product from the smelting-works, value of ore shipped out by sampling-works, the amount sent by private parties to foreign smelters, and the gold-yield from placer-mines, a grand total of nearly thirteen millions of dollars for one year presents figures for the world to wonder at.

The amount of mining transfers during the last year gives a good indication of the wave of prosperity now flowing over the camp. In this estimate is omitted all transfers where the amount was less than five hundred dollars, but includes the sales of placer-mines as well. All sums named in considerations which are known to be purely nominal have not been taken into account. This grand total of mining transfers for the year foots up to $35,350,940.

One of the most important mining tributaries to Leadville is that comprised in the district known as the "Eagle River country," about twenty-five miles north-west, where all the elements of a prosperous mining district seem to be concentrated. Outside of the Carbonate Camp proper there is no section of the mineral regions of Colorado, as far as known, so full of genuine promise as this; and its favorable showing, and the rapidity with which energetic prospectors are developing a region running for fifteen miles up and down the Eagle River, entitle it to rank among the best in the State. Before the year is over it may be that Eagle City will be no mean rival to Leadville.

"The Gunnison country," as it is called, is reached from Leadville over the Red Mountain Trail through Lake Creek Cañon, one of the most beautiful of all Colorado's cañons. This silver land beyond the Snowy Range is likely to be the Mecca of thousands of prospectors during the present season, as fabulous stories of its richness in the precious metals have been circulated, and will have their due effect upon the minds of those who seek Colorado for a fortune. In addition, the Elk Mountain region, on the edge of the Ute Reservation, has given substantial indications of silver in true fissure-veins varying in length from one to two feet. The town of Gothic has already been founded at this point, and the country explored for miles around it. The only drawback to the immediate development of this country is the Ute question. If this is satisfactorily settled, the vast resources of this entirely undeveloped region will be opened up, and we may expect that the Elk Mountains and the reservation will become one of the most populous mining camps, and possibly the richest, in the State.

Ruby Camp is in the Gunnison country, and was organized in June, 1879. It comprises the section embraced by Coal, Ohio, and Anthracite

Creeks and the North Fork of the Gunnison River, and may be said to be a tributary to Leadville. Although young, the camp has an apparently bright future before it. The mines thus far discovered are all true fissures, and where shafts have been sunk a high-grade mineral has been reached, composed of brittle ruby, chloride, and black sulphurets of silver. Sometimes native and wire silver have been found. About fifty mines have been more or less developed, but it is probable that the camp during the present season will present a lively appearance, as saw-mills, smelters, and roasters are to be taken into the district this spring. The Denver and South Park Railway is pointing in this direction. It is said that in addition to its mineral prospects there is a large deposit of bituminous coal about ten miles distant, which excels even the Trinidad coal for coking purposes. The main town in this district is named Silver Gate, and is beautifully located.

Ten Mile is an important mining district about fifteen miles from Leadville, on the western slope of the range, and is in a valley of the same name lying about eleven hundred feet above the sea-level and from three-fourths to one and a half miles wide. There are three towns, named Kokomo, Carbonateville, and Ten-Mile City, in close proximity to each other. The district has three smelters, and it is said shows more mineral than Leadville did two years ago; but capitalists have not invested here as yet to any great extent, though there are scores of mines giving abundant promise. The valley is said to be far more healthy than Leadville, while it also possesses some of the most magnificent scenery in the country in Ten-Mile Cañon, of which notice is made elsewhere.

DENVER.

In June, 1858, the first party of prospectors (from Georgia, led by Green Russell) reached Cherry Creek. In September of the same year a town was established on the present site of Denver, and called St. Charles. In October a rival town, called Auraria, was located on the west side of the creek. In November the Denver City Town Company was organized and the site of St. Charles occupied. Considerable rivalry existed between the two towns until the year 1861, when Auraria began to lose ground.

Early in 1859 a hotel, blacksmith-shop, bakery, and carpenter-shop were erected, and in April the *Rocky Mountain News* was issued by William N. Byers & Co. In the same month a convention was held to form a government for a State that was to be called Jefferson. In May a post-

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office was established. In June, Horace Greeley arrived by coach, *en route* to California, and addressed the citizens of the town before visiting the mines. In December the first mayor was elected, under a city charter granted by the provisional Legislature. In October, O. J. Goldrick opened the first school. By New Year's Day, 1860, Denver had two hundred houses, while Auraria had almost twice that number, the combined city census giving a population of over one thousand people, representing all classes, creeds, and nationalities.

In April, 1860, the towns of Auraria and Denver were consolidated. On the Fourth of July the patriotic pioneers celebrated the day in a grove close by. The close of the year found about four thousand people in the town, with three day schools, five churches, and three newspapers. During the winter of 1860–61 a stampede was made by hundreds of the inhabitants of Denver and the adjoining mining camps to the San Juan Mountains, whose reported discoveries were shortly pronounced a humbug. In April news of the rebellion reached Denver, and by August recruiting was going on for the first regiment of volunteers. For the next few years the rebellion, the big fire of 1863, and the Indian war of 1864 blockaded the route to the States, paralyzed the industries of the town, and threatened danger in every direction. Dull times prevailed until 1866, when a reaction set in. In that year over three hundred new buildings were erected, and the census showed a *bonâ fide* population of four thousand, with perhaps half as many as transients. In 1867 a Board of Trade was organized, and through its efforts the first attempt at building a railroad to connect the embryo City of the Plains with Cheyenne, and so obtain railway communication with the East and West, was made, and by 1870 the project had been successfully carried out. The Denver Pacific Railway reached the city, and it was no longer an isolated point apart from civilization, but part and parcel of the great overland highway from the Atlantic coast to the Pacific.

Such is the brief epitome of the first eleven years of the history of Denver, but it might be well to give some statistics in connection with its commercial prosperity at that time, in order that its present position may be the better placed in contrast. The place was well and solidly built up, many of its banks, churches, public buildings, and principal business-blocks comparing favorably with those of much older and larger cities in the East. It contained at that time about fifteen hundred buildings, with a population of nine thousand. The sales of general merchandise footed up $8,500,000 for the year, while coal, lumber, land sales to new settlers, live-stock and beef, flour and the value of new buildings,

Alamosa.—This town has been for two or three years the south-western terminus of the Denver and Rio Grande Railway, and has grown into some importance as the point from which to reach Del Norte, Silverton, Ouray, and the San Juan country. It has a population of about 800. Some large forwarding-houses are established here, and an extensive trade is carried on with the settlements west and south of it. It is beautifully laid out on the west bank of the Rio Grande del Norte, and is in the centre of San Luis Park. The town is entirely surrounded with majestic mountain-ranges, and presents a very attractive appearance. Overlooking the site rises Sierra Blanca, its snow-crowned crest stretching skyward to an altitude of 14,472 feet. Its snowy mantle is perennial, and its lofty crest, like the pyramids of the Egyptian dynasties, is gilded at each sunrise with the first flushing touches of the coming morn. There are many points contiguous to Alamosa that will yet tempt the artist to reproduce them. The extension of the railroad south to Conejos may take away most of the southern trade from the town, but it will still be the main distributing-point for the mining districts to the west of it. The *Independent* is a sprightly local paper, published weekly.

Saguache is the county-seat of Saguache county, and lies in the north-west corner of San Luis Park. It is the business-centre of a large and constantly-increasing agricultural and live-stock region, and was first settled in 1874. It has a population of 500, and while its growth has not been as noticeable as that of towns in mining districts, still it has been steady and the business transacted is of a substantial nature. Leadville has proven a very profitable market for all those engaged in pursuits connected with the soil, and the impetus thus given to the industries of Saguache is not now likely to retrograde. One weekly journal, the *Chronicle*, is published, while the town has the usual supply of churches and schools.

Silverton is the county-seat of San Juan county, and is a growing and prosperous town. Lofty mountains overhang the lovely little park in which the town is located, and in these lie hidden numberless silver-veins of varying richness. The great depth of the snow in winter makes the approaches to this town almost impassable for several months in the year, hence it labors under great disadvantages. The elevation, too, is somewhat high, being 9400 feet. In summer coaches connect it with Lake City and the outside world.

Silver Cliff.—This town is hardly two years old, but has sprung to a sudden prominence in the mining history of the State that promises to be enduring. It is located on the eastern slope of Wet Mountain Val-

tion of the two companies was made early in the present year, and they are now practically under one management, doing a very efficient service and coming more and more into popular favor.

The branch mint at Denver purchased over six hundred thousand dollars' worth of the precious metal. It is believed that additional facilities will shortly be provided for manipulating the minerals of the country.

The post-office business has doubled during the last year. There is now a carrier service in operation. The money-order department issued orders amounting to $325,000, and received from other offices $1,112,000. It paid out on domestic and foreign orders $435,000, and remitted nearly $1,000,000 to other points. In the registry department 12,000 letters and packages were sent, and 16,500 received. The total expense of conducting the office was about $21,000, while the receipts from the sale of stamps and envelopes, box-rents, unpaid letters, and waste paper was $82,000.

The city is supplied with water for fire, domestic, and manufacturing purposes by the Denver Water Company, with works constructed on the Holly system. Three million gallons were furnished in 1878, double the quantity of last year, and the limits of the works thereby reached. But new works, costing a quarter of a million of dollars, have been constructed, a large reservoir or lake established a short distance from the corporate limits, and in future the people are ensured an abundant supply of pure water, the capacity of the new works being from six to eight million gallons every twenty-four hours, supposed to be equal to the needs of a city of seventy-five thousand inhabitants. Thirty miles of mains have been laid, and more are being extended in directions where they are needed.

The city government is composed of a mayor, clerk, treasurer, engineer, chief of police, attorney, police justice, street commissioners, chief of fire department, and twelve aldermen, two from each ward. The fire department includes four fire and hose and two hook-and-ladder companies. There are the county hospital and St. Vincent's and St. Joseph's Homes, in charge of the Sisters of Charity. Three express companies have general offices—the Kansas Pacific, Adams, and Leadville. The Western Union Telegraph has its general Western office here.

Of newspapers and periodicals we enumerate the following: *Daily.—Rocky Mountain News*, *Tribune*, *Republican*, *Post*, *Hotel Reporter*, and *Times*; each of these issues a weekly edition. *Weekly.—Farmer*, *Herald*, *Journal*, *Mining Review*, *Financial Era*, and *Gazette-Advocate*. *Monthly.—The Antelope* and *The Colonist*.

The churches of Denver are well sustained, and some of the edifices are an adornment to the city. The pastors, as a rule, are faithful in the performance of their duty; some of them are quite talented and draw "full houses"—if the term may be allowed—every Sabbath day. Two services are generally held—one in the morning and one in the evening—with Sabbath-school in the afternoon. Wednesday evening of each week is devoted by all the denominations to a meeting for prayer. During the annual week of prayer union services are generally held. Between the pastors of the various churches a good feeling of harmony prevails. Each in his own immediate circle finds his head, heart, and hands fully employed; hence sectarian squabbles are hardly known. The influence of the pastors of the churches is felt on every hand in every kind of public enterprise having reform for its base. Especially in temperance-work have they been active. They, aided by the Good Templars, inaugurated the Blue Ribbon movement in the State three years ago, which has been so effectual in the reformation of hundreds who are now sober and industrious citizens.

The first preaching and praying ever done in the State of Colorado was done in Denver as early in its history as December, 1859, when the voice of one George Washington Fisher was heard preaching in the wilderness, and from that day onward religious privileges have not been lacking for those who are so inclined; and the proof that a large proportion of the community is a church-going class is found in the twenty-six churches and religious organizations that now exist in Denver. The Baptists have three—Zion, First Baptist, and Antioch. The first and the last of these are colored. The second is presided over by Rev. F. M. Ellis, an eloquent divine. The Catholic element sustains St. Mary's Cathedral, Church of the Sacred Heart, and St. Elizabeth's church. Two are Congregational—the First and the Second. The Episcopalians have four—St. John's, Trinity Memorial, Emmanuel, and All Saints'. There are two Jewish—the Emmanuel and the Ohawi Emune. The Methodists are numerically the strongest denomination in Denver. They sustain seven churches, as follows: African Methodist Episcopal, California Street Methodist, German Episcopal, Lawrence Street, M. E. Church South, St. James, and Evans Mission Chapel. The Rev. Earl Cranston is the bright and shining light of this branch of Zion. The Presbyterians have three churches—the Central, St. Paul's, and Seventeenth Street. Rev. H. C. Westwood, a distinguished divine lately from Philadelphia, presides over the first, which has the most pretentious church-edifice in the city. There are one Second Christian, one Reformed, one Unitarian church, and a railroad mission-school; in this last named all the churches are interested, and unite in sustaining it.

It will be seen that thus far the religious facilities have been ample for the needs of the people; but the rapid influx of population has filled all the churches to overflowing, and either larger edifices must shortly be built or new societies organized around which can crystallize the new-comers who are making homes for themselves in the beautiful and attractive "City of the Plains."

Of secret and benevolent societies the following are in successful operation, earnestly working in their respective fields of labor:

Masonic.—Grand Lodge A. F. and A. M., with an annual session in September; Grand Royal Arch Chapter; Grand Commandery K. T.; Denver, No. 5, A. F. and A. M.; Union, No. 7, A. F. and A. M.; Denver Chapter, No. 2, R. A. M.; Colorado Commandery, No. 1, K. T.; Pentalpha, No. 5, F. and A. A.; Delta Lodge of Perfection, No. 1; Mackay Chapter of Rose Croix, No. 1.

Knights of Pythias.—Colorado Lodge, No. 1; Damon, No. 2; the Endowment Rank, K. of P.

Odd Fellows.—Grand Lodge, with annual session in October; Union, No. 1; Denver, No. 4; Germania, No. 14; Denver Encampment, No. 2; Humboldt, No. 6; Arapahoe, No. 10; Colorado Degree Lodge, No. 1; Samaritan Lodge, No. 5.

Champions of the Red Cross.—Pioneer Encampment, No. 1.

Good Templars.—Denver, No. 12; Harmony, No. 4; Happy Home, No. 21.

Benevolent Societies.—Denver Lodge, No. 171, I. O. B. B.; Denver Lodge, No. 2, A. O. U. W.; Standard Lodge, No. 3, A. O. U. W.; Colorado Lodge, Knights of Honor; Gruetli Verein (Swiss); Skandia Beneficial Society; Firemen's Relief Association; St. Vincent de Paul Society; Denver Irish Progressive Society; Ancient Order of Hibernians; St. Joseph's Total Abstinence Society.

The school system of Denver is well established, thoroughly classified, and under excellent superintendence. Eleven schools, including the high school, are open, but cannot meet the demands upon them; in several of them sessions of half a day only are allowed to certain classes. But this condition of things is not likely to last long.

A noticeable feature, establishing the recognition Denver has received in the East and in England, is the introduction of companies controlling large amounts of capital, which is used in developing the industries of the country at large. Two years ago the advent of the Colorado Land and

Investment Company of London (limited) marked a new era in the financial history of Denver. Making the city its head-quarters, money was loaned, especially throughout the farming section, at a rate fifty per cent. lower than had prevailed at banking institutions and with private individuals. A drop of from twenty-four and eighteen per cent. to twelve per cent. per annum made a vast difference to a large class of people on whom grasshopper visitations had fallen heavily. The relief came at an opportune season for these in the establishment of this new company.

The success attending this company has led to the establishment of others, based on foreign capital, for the construction of canals, the sale of lands under them, the erection of hotels, and other enterprises involving the outlay of vast sums of money. The Weld and Larimer Irrigating Canal in the northern part of the State is one of these, under the management of the same parties interested in the loan company. This canal is nearly finished, and will prove of incalculable benefit.

But a greater enterprise still, in the same line, has been inaugurated by which Denver will be directly benefited, though the whole State will ultimately feel its wholesome influence. This is the Platte Canal, by which hundreds of thousands of acres in the immediate vicinity of Denver will be thrown open to cultivation. The arable lands of the country will be increased twenty per cent. by this canal, and be capable of meeting the home demand for the products of the soil. A system of reservoirs in connection with the canals is contemplated, by which water running to waste in seasons when no irrigation is going on will be stowed away, to be drawn upon in emergencies. The effect of such an agricultural development near Denver will give an impetus to its growth that as yet cannot be realized to its fullest extent. The canal is now in course of construction, and before the year 1881 closes will be completed. Denver will derive immediate benefit while its construction is going on, but when the lands are settled it will increase its business, its real-estate values, and its importance in no small degree.

SOCIETY AND CHURCHES.

Everywhere in Colorado—the mining camps being no exception—good society may be said to exist. Moral and religious teachings are observed with the same strictness as in any of the established cities of the Eastern States. Indeed, why should they not? The inhabitants of the State have come from every part of the Union, bringing their culture, their intelligence, their thrift, with them. While there is much that may be denominated rude and uncouth on the general surface of society, there is an undercurrent that is strong and deep and ceaseless, for ever flowing in channels that conserve society, elevate its tone, and lift it upon a plane of civilization worthy the respect and recognition of the most refined and cultured minds in the Union.

It can no longer be said of society in Colorado that it is rude and rough; during the last ten years a great progress has been made in toning down frontier traits, rounding the sharp angles of character, and moulding the peculiarities of the adventurous classes who were first tempted hither by a thirst for gold; and now the rapid building of cities and towns, the establishment upon a permanent basis of schools of learning and religion, the accumulation of material wealth, and the constant accession made to the population by the wealthy, the cultured, the renowned of other States, places Colorado on an equality with her older sisters in respect to all the privileges that are peculiar to older and more densely populated sections of the country.

It is not to be imagined, therefore, that Colorado is inhabited by a half-civilized race of beings. All over the State are to be found communities of orderly and ambitious citizens, around whom are clustered all the refining influences of the family circle. In the cities and larger towns entertainments, concerts, lectures, festivals, balls, and other amusements are quite as frequent and as creditably managed as in other places of like population. The public-school system will compare favorably with that of any other State, and in addition to this there are educational institutions of an advanced character, now firmly established, at which thorough and complete academical and collegiate courses can be pursued if desired. Throughout the State all the religious denominations are well represented. There is not a town, and indeed hardly a village, in the State that has not its place of worship, and the sound of the church-going bell is as familiar to the ear as it was in years gone by in valleys lying far away down the slopes of the Prairies, among distant villages by the sides of the great lakes or the still greater sea. There is no lack of religious privileges for those who desire and take them into account as they canvass the possibilities of a future home in the Great West.

EDUCATIONAL.

The public-school system is based upon that adopted by Illinois. The people of Colorado have always been interested in the educational interests of the State, and there have been erected a number of large and expensive school-buildings that would do no discredit to towns three times as large in more settled communities.

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A GLIMPSE OF DENVER, COLORADO.

The schools are maintained by a direct tax, averaging three mills to the dollar, on all the taxable property of the State, and by the proceeds of the lease or sale of school-lands, while the residents of each school district have a right to levy taxes for special purposes within their own jurisdiction. The fund arising from the leasing or sale of school-lands thus far has not been large, but the rapid increase of population will in time make the revenue derived from this source quite a respectable sum, and aid in keeping at low figures the general tax, which by law has for its minimum two mills on the dollar.

The school law makes it the duty of county superintendents to examine all persons who present themselves at the quarterly examination, and to grant certificates to such as are deemed worthy; and it is further provided that no person shall be paid out of the public fund for teaching unless such person holds a certificate of competency signed by the said superintendent. A series of uniform questions has been prepared by the State superintendent by order of the State Board of Education, and three grades of certificates are issued, as follows:

FIRST-GRADE CERTIFICATE.—*First Group.*—Average, 90 per cent.; no branch below 75 per cent. *Second Group.*—Average, 75 per cent.; no branch below 60 per cent.

SECOND-GRADE CERTIFICATE.—*First Group.*—Average, 75 per cent.; no branch below 60 per cent. *Second Group.*—Average, 60 per cent.; no branch below 40 per cent.

THIRD-GRADE CERTIFICATE.—*First Group.*—Average, 60 per cent.; no branch below 50 per cent. *Second Group.*—Average, 50 per cent.; no branch below 40 per cent.

The topics are divided into two groups, to wit: *First Group*—Arithmetic, United States history and Constitution, reading, orthography, grammar, theory and practice, and geography. *Second Group*—Physiology and laws of health, school law, botany, and other natural sciences.

The State law also provides that State diplomas of perpetual validity may be issued by the State Board of Education to applicants who have taught two years or more in this State with eminent success, and who pass a satisfactory examination or who have received a diploma elsewhere.

By the last biennial report of the State superintendent we find that the number of persons in 1878 between the ages of six and twenty-one was 28,473, with an average percentage of enrollment of 63; number of school districts in the State, 372; number of schoolhouses, 249; value of schoolhouses and property, $474,771; number of male teachers, 226;

number of female teachers, 341; average wages of male teachers, $49.90 per month—of female teachers, $46.95; average cost per month for each pupil, $2.72. The table of wages shows a decrease of ten per cent. from the preceding year, but it will be observed that the wages of male and female teachers are nearer an equality than in many other States. When the wages of female teachers in Massachusetts average one-half less than male teachers, it is gratifying to note that more are employed than males, showing that the sex is recognized as better instructors for the young.

As yet public-school libraries are few in number; there are not over four thousand volumes in the various libraries.

There is a State university located at Boulder, with a preparatory and a normal department, the average age of the pupils, of whom one hundred are in attendance, being eighteen years. In the preparatory department Greek, Latin, German, French, geometry, algebra, physics, and chemistry are the branches taught; in the normal department, geography, arithmetic, English grammar, United States history, reading with phonetic analysis, and spelling. The university is supported at an expense of about $15,000 per annum.

There is a college at Colorado Springs, where there are four courses of instruction—for the degree of bachelor of arts, preparatory school, normal school, mining and metallurgy. This college was founded in 1874, and is open to students of all denominations at a cost for tuition of $25 per year, so that the institution is practically free to all. There are four terms in each year.

The State Agricultural College is located at Fort Collins. The leading object of this institution is to impart a thorough and practical knowledge of all those branches and sciences that pertain to agriculture and the mechanic arts. Lectures on practical agriculture, weekly exercises in English composition and declamation, contemporaneous history, lessons in free-hand, industrial, and perspective drawing, are continued throughout the entire course. The course embraces three terms of four years. The calendar is made to conform to the necessities of an agricultural college. Its vacation is in winter, but this interval between the autumn and spring terms is employed by the faculty in visiting and lecturing on topics connected with their departments in various portions of the State. Last winter a series of farmers' institutes was held with great success. Tuition is free to all within the State.

There are a number of private institutions of learning at different points through the State, so that it is to be said of Colorado that the needs of the rising generation are recognized and liberally provided for, considering the scattered nature of its settlements and the constant changes going on within its borders. The progress in this direction made during the last few years is extremely gratifying to the most ardent educational enthusiasts. It is the boast of Denver that her public schools are equal to the best in the country.

increased the total to nearly twelve millions. The banks carried an average of $1,500,000 in deposits, and the shipment of bullion was nearly $6,000,000. Four lines of railway were built or building, centring in Denver—the Kansas Pacific, Denver Pacific, Colorado Central, and Boulder Valley. The Denver and Rio Grande, leading southward, was being graded, and the narrow-gauge system from Golden to the mountains projected. One woollen-mill, two flouring-mills, an iron-foundry, two planing-mills, a terra-cotta factory, a carriage-factory, several wagon-factories, a turning-shop, and other industrial enterprises marked the progress the town was making in the department of manufactures. A branch of the United States Mint was in operation, while a theatre gladdened the pleasure-loving public with its nightly attractions. The business of the town was on a solid basis, and the outlook exceedingly favorable.

From 1870 to the present time the growth of Denver has been steady, while to-day the city enjoys the flood-tide of prosperity consequent upon the rapid settling up of the country. During the year 1879 the arrivals averaged two thousand per week, filling the hotels to their utmost capacity and taxing the ingenuity of landlords, while private houses for boarding were filled to repletion.

To-day there is no more beautiful and attractive city than is Denver. She has proven her title to the name of the "Queen City of the Plains," and as a thriving trade-centre, great thoroughfare, and pleasure resort she has become known all over the Union. For a hundred and fifty miles the eye can take in the outlying foot-hills and the Snowy Range, forming a landscape of whose never-ending beauty the eye cannot grow weary. The streets are broad, solid, and cleanly, lined with massive business-blocks, elegant residences, and cozy cottages, while shade trees and lawns abound.

A review of the trade of Denver for the year 1879 will give some idea of the advance during the last ten years. Twenty-six millions of dollars' worth of business was done in the leading branches, while those not enumerated will swell the figures up to thirty millions. The banking business is a safe index to the growth and prosperity of a community. Four national and one private bank, with a combined capital of $600,000, show total deposits amounting to $5,875,665, and loans and discounts to $2,721,125. The amount of exchange drawn was $36,500,000. The building of the reduction-works at Argo within the last two years has materially aided the growth of the city. Removed from Black Hawk early in 1879, active operations have been carried on and a large amount of bullion produced, amounting in gold, silver, and copper to $3,000,000.

Real-estate transfers have been unusually active of late, and an advance in prices of nearly fifty per cent. has gladdened the hearts and filled the purses of fortunate owners. The records of the Recorder's office show transfers amounting to about two thousand in number, with a consideration of nearly three million dollars. This is an excellent showing for one year, but the present season will probably double it, both in the number of transfers and amount of values, thereby proving the existence of a healthy financial condition, the confidence of capitalists in the assured growth of the city, and establishing beyond question the fact that it is to be the largest and most important commercial centre between the Missouri River and the Pacific Ocean.

The number of buildings erected during the last year is without precedent in the history of the city. Yet the demand for them has far exceeded the supply, rapid as it has been, and there seems to be no likelihood of any cessation of building operations during the present or the next few years. Denver seems to possess peculiar attractions for those who are making fortunes in the mining districts, and is yet to become famous as the residence of a score or more of "bonanza kings," who are putting their surplus moneys into splendid business-blocks and superb private residences. Probably five hundred new buildings were erected last year, costing $2,250,000. Among the most prominent of these may be mentioned the Grand Hotel, costing $250,000; the Tabor Block, $180,000; Glenarm Hotel, $40,000; Twenty-fourth street public school, $24,000; Wentworth House, $30,000; Senator Hill's private residence, $20,000; Washington Terrace, $18,000. Scores of elegant residences, costing from $3000 to $10,000, have been put up, while the number of tenement-houses, containing from four to six rooms, has not been half equal to the demand. It may be that for several years to come this remarkable growth can be looked for, as there seems to be no diminution in the arrival of strangers and no abatement in the influx of capital.

The street-railway system, of late years fully equal to the requirements of business, is now hardly adequate. The number of cars put on has been doubled during the year. There are only eight miles of road in operation, but the widening of the area of residences, and their extension into the suburbs east and west and south, will necessitate new branches to accommodate the needs of the residents of these points for rapid transportation from their places of business to their homes.

During the year two telephone systems have been in operation, with nearly a thousand connections. These lines reach out to the neighboring towns of Golden, Central, Black Hawk, and other points. A consolida-

PROSPECTING.

PROSPECTING is simply hunting for mineral—in this case one of the precious metals—where the mineral lies in fissure-veins deeply imbedded in granite, gneissoid, or rock of like density. The work not only requires muscle, courage, and patience, but a considerable knowledge of geology and mineralogy. The prospector must have some idea of the external indication of the presence of veins which may be hundreds of feet below and thousands of feet distant from the point where the "blossom" is found.

First, the prospector seeks the "blossom" which indicates the presence of the mineral, and then he next tries to find out where it comes from. He examines carefully the topography of the country, turns over loose stones, peers into and along beds of streams, and is perhaps at last rewarded by finding the "blossom"-rock. He carefully turns it over. If its edges are sharp and defined and the fracture evidently of recent date, he is satisfied the vein is near at hand. If, on the contrary, the corners are rounded and the fracture of remote date, he is satisfied it must have travelled a considerable distance. In either case, he must hunt patiently, and often for a long time, before he strikes the prize.

But prospecting at Leadville is quite another affair. The carbonate mineral, instead of being found in vertical lines, held in the strong embrace of the solid rock, which must be drilled and blasted and tunnelled before the mineral is reached, occupies a more nearly horizontal position, varying with the dip of the surface. Up to the present time there are no certain superficial evidences of the existence of the mineral. From the day the first carbonate-mine was struck down to the present time the prospector has worked in the dark until his spade struck the ore. Proximity to a known body of ore is perhaps the only "guide." If a person gets a claim near a mine in which mineral is known to exist, he has reasonable assurance of a valuable claim. And it being a determined fact that carbonate ore exists in large and paying quantities not only at Leadville, but in various directions for fifty miles around, the prospector who starts in to-day has every advantage over those whose luck alone brought to light the first carbonate ore in the Leadville district.

Pay ore is found at Leadville on Fryer, Carbonate, and Iron Hills, in all the gulches above the timber-line, across the valley of the Arkansas, at Oro, Malta, near the grass-roots and hundreds of feet below the surface. The same conditions obtain at Ten Mile, Eagle River, on Elk Mountains, at Twin Lakes, beyond the Saguache, in the Gunnison country, at Chalk Mountain, Tin Cup—shafts being sunk and new paying mines being constantly found. If these facts mean anything, they mean that inasmuch as the prospector who goes in now has the benefit of all who have gone in before, and a knowledge of the great extent of the carbonate deposit to guide him to the best location, he stands a better chance of speedy and sure success than he would have stood a year ago. The pioneers have "blazed" the way, and it is an easy matter for any man with provisions for a few months, a level head, and vigorous muscle to follow a path already marked out. In prospecting three men should go together. They need each a pick, costing $1.50, a shovel, $1.50; they are then fully equipped, so far as tools are concerned, for commencing a shaft, which should be about four feet by six. After going down a few feet they need a bucket, costing $5, windlass and rope, at say $25, drills and hammers, fuse and blasting-powder, at $10—making a total cost for outfit of $49. If working some distance from town a *burro* will be needed, and can be obtained at from fifteen to thirty dollars. Provisions for a party of three would not cost above thirty dollars a month, and a temporary shanty can be built in a short time, at no cost save labor. Thus a prospecting-tour of two months can be made at a total expenditure of less than one hundred dollars. Many of the most valuable mines were discovered on a less expenditure than this, and what has been done will be repeated hundreds of times before the summer is over. There remains after getting the outfit nothing to do but "dig."

"GRUB-STAKES."

A grub-stake is a prospecting outfit furnished by men of wealth—*i. e.* those who can command a hundred dollars or so—to impecunious miners. For instance, A and B desire to prospect, and, not having the means to procure the necessary outfit, or perhaps having sunk shafts until their means are exhausted, C comes along and gives them a "grub-stake" for an interest in whatever they may find. In other words, he "mines by proxy."

A grub-stake of less than fifty dollars got Governor Tabor one-half of the Little Pittsburg and made him a millionaire, and grub-stakes, properly placed and followed up, are to-day as good investments as any man ought to wish.

LOCATING A MINE.

The process of coming into possession of a mine is this: A man stakes out his claim—three hundred by fifteen hundred feet. To do this he sets up a stake three inches in diameter, square at the top, and if his name be John Smith writes in pencil upon the four sides, "John Smith's Lode, Corner No. 1." He steps off the distance and sets up such a stake on each corner, marking each stake in succession, as "Corner No. 2," and so on. Then he begins to sink his shaft. Two men work the windlass and one digs, and the three take turns in digging. Sometimes a fourth man cuts the timber to be used in "timbering" the shaft; that is, walling it up to prevent its caving in. Good saplings adapted for the purpose grow on the mountain-side, and it takes all the trees on fifteen acres to timber the average shaft. Thus it happens that the original owners of a claim often number four men, and almost always number three. The shaft is usually four feet wide and six feet long. Three men working at such a shaft can go down through the first fifty feet at the rate of from three to five feet per day, timbering as they go, and through the next fifty feet, two and a half to three and a half feet per day; that will probably bring them to rock, through which they must blast, and they cannot go faster than two feet per day, and even that is good work. On a contract the first fifty feet will cost $3.50 per foot, the next fifty, $5.50 per foot, and after that it will cost from $8 to $15 per foot to go down, according to the hardness and depth of the rock. The contract-price for sinking a shaft averages $4.50 to $6 per foot, including curbing.

Thus the diggers go down through the wash and the porphyry—and the rock and the iron if they find the last two—until they come to the "contact." The depth which they have to go varies, as I have said. In the Adelaide Mines mineral is in some places but four feet under the surface; in the Morning Star it is two hundred and fifty feet. On an average it is one hundred feet down. Even the most experienced miner cannot tell, by looking at what is before him, whether the stuff has mineral in it or not. So he has it assayed. This costs from $1.50 to $5, and takes from two hours to a day. If he finds he has mineral, he goes for a United States surveyor and has his claim surveyed and recorded, and he writes on his four stakes the date when the survey was made. He now owns the claim. It is his without having to pay the government anything, as the latter gives the claim to the man who finds the mineral. It is a disputed point whether iron is "mineral" in the sense contemplated by the law, but the custom here is to have surveys made on finds of iron.

In staking out his claim the owner is not compelled to run his survey over the claim that he first staked out. He can shift his lines in any direction that he chooses, determining that by the pitch and direction of his own vein or deposit. It will often happen that he will thus take in the shaft which is being sunk by another man near him—will "survey him in," as it is called—and that other man has no recourse.

Suppose several men have claims staked out near his, and have shafts started. As soon as the first man strikes mineral the others feel that their chances for striking it are good, and they all go to work with might and main to be the next to strike it, for that man is the lucky one, since he has the next choice of land. Additional "shifts" of men are put on, the work goes forward night and day, a horse is used to turn the windlass if it can be so arranged, and the race is as if for dear life. When the next man finds mineral he makes a break for a surveyor; and if two strike it at the same time they race like mad for one, for the claim first surveyed is the one that holds the land.

It often happens that the mineral found has such a direction that a survey has to be made over a claim already surveyed. In that case the new survey can hold the land within its claim and outside the other claim, but that part lying within the first claim remains to the owners of the first claim. However, if the second claim is a rich one, the overlapping portions have enough mineral in them to satisfy any man; but in any case the new claimant yields with good grace. Surveys are always made one hundred and fifty feet each way to the side-lines from the discovery-shaft; they cannot be made two hundred feet one way and one hundred feet the other, nor be divided up unevenly; therefore it happens often that a man cannot get a "full claim"—that is, one three hundred feet wide—but has to be content with what he can get.

"BONDING A MINE"

is a process needing explanation. After a set of men have found mineral it frequently happens that they bond it to some one to sell—that is, they execute an instrument setting forth that, in consideration of the bonder putting up so much of a forfeit, he shall have a certain number of days —thirty, sixty, or ninety—within which he may sell the mine at whatever he can get for it, with the understanding that if the sale is made the owners of the mine are to receive a stipulated price. For example, the Little Giant had a half interest bonded for $110,000. The bonder was at liberty to sell that half interest for as much more as he could get for it within the time agreed upon. If he failed to sell it within that time he lost his forfeit—forfeits range from one to five thousand dollars—and the control of the mine reverted to the owners.

WAGES.

The wages paid to good miners here have steadily kept at $3 a day; foremen, $100 to $125 a month. Surface common labor is paid from $2.25 to $2.50 a day. The roads from all mines, except those located on Iowa Gulch, are of continuous down-grade. At hauling ore teamsters load fully four thousand pounds per trip, and their contracts are so made as to give them from nine to ten dollars daily gross earnings. From Little Pittsburg to Harrison or Grant's smelter they receive from $1.75 to $2 per ton; from the Adelaide Consolidated Mine of Malta, $2.25 per ton. These prices make it cost about one dollar per ton to get the ore "on the dump"—that is, on the pile at the mouth of the mine—and one dollar per ton more to deliver it to the smelter. Very little blasting is required in the mines, most of the mineral being capable of extraction with a pick and shovel.

DEFINITIONS OF MINING TERMS.

The newcomer into a mining camp will hear and read of many things totally unknown to any other kind of business, and he will find a knowledge of the various mining terms of no little benefit as well as pleasure. He would not want a "stope" for his dinner, nor to regard "country rock" as necessarily remote from a populous city, nor would he desire in a mining camp to always regard a "horse" as a good "feeder." "Stamps" he will not find so easily transported as our national currency, nor a "whim" possessing any human eccentricity.

By carefully looking over this compendium of mining terms the reader will be able to read and talk more intelligently, and therefore more satisfactorily:

Adit.—A level, a horizontal drift or passage from the surface into a mine.

Alluvium.—A deposit of loose gravel between the superficial covering of vegetable mould and the subjacent rock.

Apex.—The top or highest point of mineral.

Argentiferous.—Containing silver.

Assay.—To test ores by chemical or blowpipe examination.

Auriferous.—Containing gold.

Bed.—A horizontal seam or deposit of mineral.

Blende.—An ore of zinc consisting of zinc and sulphur.

Bonanza.—Fair weather; a mine is said to *en bonanza* when it is yielding a profit.

Breast.—The face of a tunnel or drift.

Cap.—A vein is in the "cap" when it is much contracted.

Carbonates.—Soft carbonates: salts containing carbonic acid, with a base of lead. Hard carbonates: the same with iron for a base.

Cheek.—The side or wall of a vein.

Chimneys.—The richer spots in lodes as distinguished from poorer ones.

Claim.—The space of ground located and worked under the laws.

Chlorides.—A compound of chlorine and silver.

Contact.—A touching, meeting, or junction of two substances, as rocks.

Contact-vein.—A vein along the contact-plane of, or between, two dissimilar rock-masses.

Country.—The ground traversed by a vein.

Country rock.—The rock-masses on each side of a vein.

Crevice.—A narrow opening, resulting from a split or crack; a fissure.

Cribbing.—The timber or plank lining of a shaft; the confining of the wall-rock.

Cropping out.—The rising of layers of rock to the surface.

Cross-cut.—A level driven across the course of a vein.

Cut.—To intersect a vein; open cut, a level without a covering driven across the course of a vein.

Dike.—A wall-like mass of mineral matter filling fissures.

Diluvium.—A deposit of superficial sand, loam, pebbles, gravel, etc.

Dip.—The slope, pitch, or angle which a vein makes with the plane of the horizon.

Drift.—A horizontal passage underground.

Dump.—A place for deposit of tailings or waste rock.

Face.—The end of a drift or tunnel.

Fault.—A displacement of strata or veins, so that they are not continuous.

Feeder.—A small vein joining a larger one.

Fissure-vein.—A fissure or crack in the earth's crust filled with mineral matter.

Float.—Loose rock or isolated masses of ore, or ore detached from the original formation.

Foot-wall.—The layer of rock immediately under the vein.

Gangue.—The substance enclosing and accompanying the ore in a vein.

Gash-vein.—A vein wide above and narrow below.

Hanging-wall.—The layer of rock or wall over a lode.

Heading.—The vein above the drift.

Horse.—A mass of rock-matter occurring in or between the branches of a vein.

Incline drift.—An inclined passage underground.

In place.—A vein or lode enclosed on both sides by fixed and immovable rock.

Lagging.—The timber over and upon the sides of a drift.

Level.—A horizontal passage or drift into a mine from a shaft.

Lode.—Aggregations of mineral matter containing ores in fissures.

Matrix.—The rock or earthy matter containing a mineral or metallic ore.

Mill-run.—A test of a quantity of ore after reduction.

Outcrop.—That portion of a vein appearing at the surface.

Patch.—A small placer-claim.

Placer.—A gravelly place where gold is found—includes all forms of mineral deposits excepting veins in place. (Sec. 2329 *Rev. Stat. U. S.*)

Pocket.—A rich spot in a vein or deposit.

Prospecting.—Searching for new deposits; also preliminary explorations to test the value of lodes or placers.

Riffle-blocks.—Wooden blocks set on end in a sluice, with interstices for catching gold.

Selvage.—Thin band of earthy matter between the vein and walls.

Shaft.—A well-like excavation in the earth.

Shift.—The time for a miner's work, in one day or night.

Sluices.—Boxes joined together, set with riffle-blocks, through which is washed auriferous earth.

Smelting.—Reducing the ores in furnaces to metals.

Stamps.—Machines for crushing ores.

Stope.—One of a series of steps into which the upper surface of an excavation is cut; to excavate in the form of steps above a drift.

Stoping.—The act of stoping or breaking down the surface of an excavation with a pick.

Strike.—The extension of a lode in a horizontal direction.

Stulls.—A framework covered with timber or planks to support rubbish in working a stope.

Sump.—That part of the shaft below the platform used for receiving water.

Tailings.—The refuse matter discharged from the end of a sluice.
Tunnel.—A level driven at right angles to the vein, which its object is to reach.
Vein.—Aggregations of mineral matter in fissures of rocks.
Walls.—The sides next to the lode.
Whim.—A machine for raising ores and refuse.
Winze.—A shaft sunk from one level to another.

NEBRASKA AND ITS RESOURCES.

INTRODUCTORY.

IN folk-lore there is this story: There was a man tired of the patient cultivation of his little farm, and who desired to be rich without labor. Lacking wealth, life had become "stale, flat, and unprofitable." Three times he dreamed there was treasure hid under the earth in his old orchard, which for years had been barren of fruit. Three is the regulation number that makes a dream true; and so, in an ecstasy of excitement, he revealed the secret to his wife, and began to dig. Round one tree he dug a mound of earth, and round another, until there was not a gnarled trunk about whose roots he had not let in the vitalizing air. But there was no treasure. Of course he grew angry over his wasted labor, and he had a sorry time when his neighbors hung on his fence and laughed at his folly. Spring-time, however, came, and the trees blossomed. Autumn followed, and they were loaded with fruit. Years went on, the old orchard yielding a rich revenue; and so the man found there was golden treasure hid in the earth after all, and he grumbled no more because his farm was not a literal gold-mine, but worked it with vim, and his land made him as wealthy as a man has need to be. Our fathers, who composed this parable, knew what they were talking about quite as well as the old Greeks when they made the myth about exhausted Hercules renewing his strength at the touch of the Earth-mother. Gold is good, but it usually costs the miner as much to win it as it is worth. The productions of the soil are better in the long run, for it is on these that all life must base. In her agricultural productions Nebraska is rich, and will be richer. She boasts soil that is nowhere excelled, a climate favorable to production, and pure water in abundance.

GEOGRAPHY OF NEBRASKA.

The area of the State comprises 75,995 square miles, or 46,636,800 acres—roughly speaking, as large as all the New England States, or all Pennsylvania and half of New York. Its length is 412 miles and its width about 200. It is between the parallels of 40° and 43° north, thus placing the whole State in the latitude of Pennsylvania, Southern New York, Northern California, and Southern Oregon; and between 18° and 27° west from Washington or 95° and 104° west of Greenwich. The State is called prairie. So it is, in the sense of the word which means meadow, but not in that secondary sense which implies a land of uniform flatness. In real truth, Nebraska is a part of the lowest eastern grass-clothed slope of the Rocky Mountains. The eye alone will make no observer aware of this fact. Nevertheless, from the eastern to the western boundary of Nebraska there is a gradual and uninterrupted rise of the land of about seven feet to the mile in Eastern Nebraska, and from that to ten feet in Western; and thus it comes that while the land on the eastern boundary is 910 feet above sea-level, on the western boundary it is about 5000. The surface-form of the State is, of course, made by the rivers. The eastern front of the country shows bold, wooded bluffs to the Missouri, their outlines being cut and scarped into fantastic and picturesque forms by the washing water. West of the Missouri bluffs, except on the table-lands, there is no flat, but a land of many changing forms—now broad bottoms bounded by low hills, now picturesque bluffs, and, especially in the grazing-region, ravines sometimes as rugged as the gulches in the gold-fields. Now and again a river flows full to the bank, from which the bottom—from a mile to four or more miles wide—spreads out on either hand; but generally the streams run in deep beds, the high, steep banks and the narrow first bench being thickly clothed with timber. The general ascending lay of the land is broken west to east by three main drainage-channels. On the northern boundary of the State are the Niobrara and the Missouri Rivers, of which latter the Niobrara is an affluent. The Platte, a winding, shallow, spreading stream, dotted with numerous islands and running over a bed of white sand, flows through the whole length of the State from west to east at a distance of one hundred to one hundred and twenty miles south of the Niobrara; and from fifty to eighty miles south of the Platte the Republican River has its channel. These rivers head in or near the mountains. Their flow is west to east, and their drainage-area on the south is limited to a belt of ten to fifteen miles, and the tributary streams from that side are few.

North of each stream, however, its affluents are numerous, and the general flow of their waters is south-east. This is the topography of Nebraska in barest outline, and with the map before him the reader can fill in the details. He can imagine the great plain ascending to higher altitudes as the mountains are approached; the rivers, west to east, making three great valleys, and two elevated divides separating the valleys; and, finally, the smaller streams exhibiting the land as broken into an almost infinite number of gently-undulating hills and valleys, with great table-lands on the summits, the trend of which is south-east.

GEOLOGY OF NEBRASKA.

In the south-eastern part of the State, Upper Carboniferous and Permian deposits come to the surface, the boundary-line running south-west from Washington county to about the centre of the southern line of Thayer county. Over one-third of the State west of this line Cretaceous deposits make the surface, and west again the Tertiary. The surface geology of Nebraska represents great periods in the history of the formation of the crust of the globe—glacial epochs and ages of time when seas and lakes covered the land, now the centre of the United States. It is for a scientific treatise to describe in detail the accumulated changes of these eras—the grinding of the mills of the gods which produced life and swept away life, ultimately resulting in the fertile Nebraska which is to-day. It is a marvellous story whose record is everywhere written in Nebraska, but in this article there is not space for its telling. The final formative processes are, however, interesting to the farmer, inasmuch as they describe the land he has to till. Toward the close of the last Glacial Period the continent slowly uprose, and a portion of this region became dry land. Yet great fresh-water lakes remained, one in Nebraska and Iowa being estimated as five hundred miles long and from fifty to two hundred miles wide. There was the Missouri River, then and now the muddiest river in the world. For a thousand miles its course was, and is, through deposits readily friable and easily worn and borne away by the water, especially as at this time, at the sources of the Missouri and Yellowstone, the water-action was aided by the erosive action of moving ice-masses. When the river entered the great lake its current ceased, and the suspended sediment dropped to the bottom. The land was now being gradually upheaved. As it rose the waters of the loess lake were drained off by the Missouri, and its bed became a vast marsh. The present broad bottoms of the country were at that time river-beds, and with their waters still came down the muddy débris from the mountains, which was largely deposited at the bottoms of the great streams. The land was still rising, and as it rose the rivers drained off the surplus waters. The river-beds were cut deeper into the yielding soil, and the time ultimately came when Nebraska was fixed in the condition which exists at this day—the loess being largely the soil of the uplands, and the alluvial that of the river-valleys. The two deposits are similar in chemical elements, and they form the richest soil in the world, and most valuable for agricultural purposes, ranging in thickness from five to one hundred and fifty, and even two hundred, feet. Careful analyses of the soil show that in the loess over eighty per cent. of the formation is finely-comminuted silica—so fine that its true character can only be detected under a microscope. About ten per cent. of its substance is made up of carbonates and phosphates of lime. There are some small amounts of alkaline matter, iron, and alumina, the result being a soil that can never be exhausted until every hill and valley which composes it is entirely worn away. Its finely-comminuted silica gives it natural drainage in the highest degree. When torrents of rain come the water soon percolates the soil, which, in its lowest depths, retains it like a huge sponge. When droughty periods intervene the moisture rises from below by capillary attraction, supplying nearly all the needs of vegetation in the dryest seasons. The richer surface-soil overlies the subsoil, and it is from eighteen inches to three and four, and even six, feet thick. It is organically the same as the subsoil, but enriched with organic matter, the growth and decay of innumerable centuries—a garden soil easily cultivated and making the arable farm as a garden.

CLIMATIC CONDITIONS IN NEBRASKA.

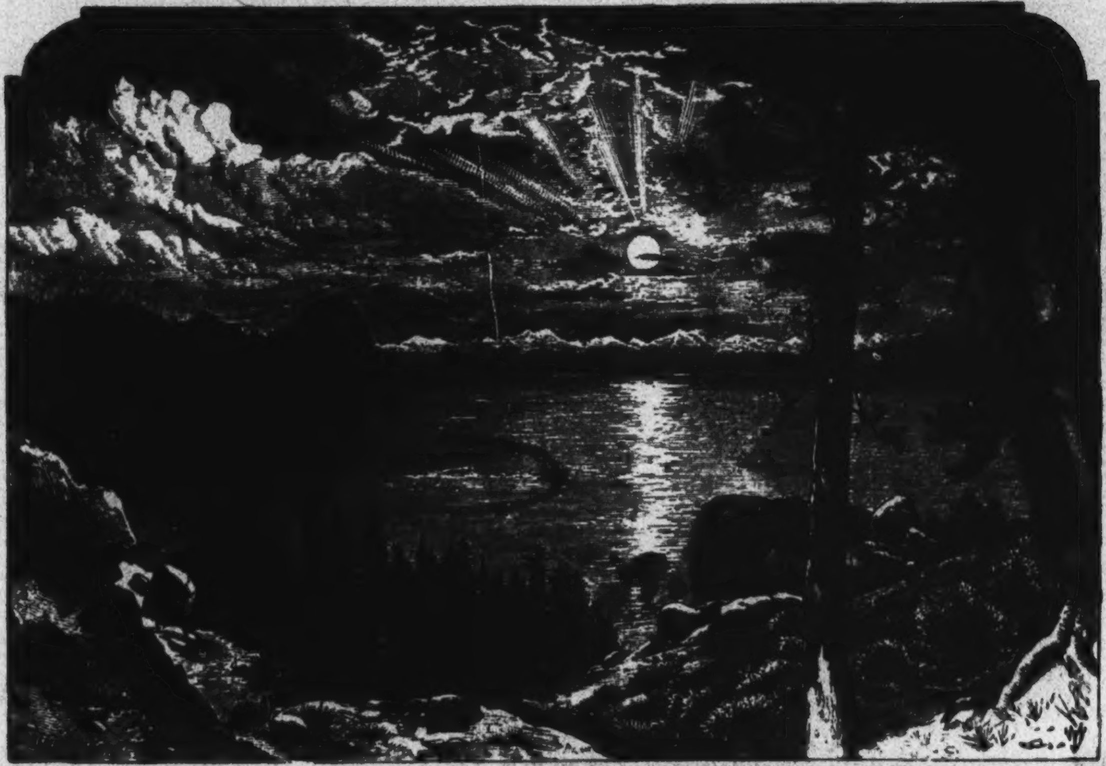
In the first place, there is water in abundance underground, on the surface, and coming from the clouds. At a depth of twenty to sixty feet, and at some places sixty to one hundred, there is a thick layer of clear sand, which in most cases rests upon a bed of rock or clay; and so abundant is the water in this sand that in many places subterranean streams are formed, which are struck in sinking shafts. Everywhere abundant water, above the average in purity, is obtained at the depths named, the cost of a common tube-well being about seventy-five cents per foot. On the surface rivers, creeks, prairie-ponds, and springs abound. No map yet published does justice to the numberless small streams that exist in the State, even the plats of the public surveys failing to indicate them all; and, indeed, there are large areas in which running water is now found on every section, where there was none when those surveys were made. The rainfall is ample. The best data accessible are the tables kept by Dr. A. L. Child of Plattsmouth, from which the following is compiled:

Year.	Season.	Temperature.	Yearly Snow.	Yearly Rain and Melted Snow.	
1866	Winter	19.99°	11.45 inches.	4.10 in.	
	Spring	47.03°		8.34 "	
	Summer	72.78°		11.95 "	
	Fall	49.75°		7.11 "	31.70 in.
1870	Winter	22.14°	22.00 inches.	4.60 in.	
	Spring	46.17°		9.50 "	
	Summer	70.00°		9.10 "	
	Fall	42.64°		8.90 "	32.10 in.
1875	Winter	15.06°	29.26 inches.	2.08 in.	
	Spring	45.55°		12.48 "	
	Summer	71.67°		28.70 "	
	Fall	47.31°		6.96 "	50.22 in.
1878	Winter	33.01°		3.57 in.	
	Spring	52.71°		12.64 "	
	Summer	72.86°		22.48 "	
	Fall	15.98°		4.78 "	43.47 in.

The average rainfall for these five years is 32.29, as compared with 34.13, the average of eleven years in Illinois. From the middle of the State, west, the rainfall is somewhat less than the table indicates, but in the eastern half the average is 32, two-thirds of which is during the agricultural months, or quite as much rain at the precise time when it is needed as falls during the same months in Missouri, Illinois, Indiana, Ohio, and New York. A peculiarity of the rainfall is that it is mostly at nights, so that the heaviest showers, quickly draining into the land, scarcely interfere with work on the farm. The temperature is of the temperate zone, healthful and bracing to man and beast, and in which corn, small grains, apples, and peaches come to rich perfection.

NATURAL PRODUCTIONS.

The prairie, clothed only by natural processes, presents its own testimony to the riches of the State. Its whole expanse is covered with grasses, there being not fewer than one hundred and fifty species, and the most abundant making the best pasture, showing green at the end of April and affording feed until November. The blue-joint grows everywhere except on low bottoms. Under ordinary conditions its growth is



LAKE TAHOE.

BY THOMAS MORAN.

two and a half to four feet, and on cultivated grounds it is found from seven to ten feet high. Wild oats grow on the uplands, mixed with blue-joint. This grass is relished by cattle, and is abundant. The buffalo-grass, low in habit, is now found in the western half of the State. It disappears before cultivation, but it is Nature's provision of food for grain-eating animals during winter on the prairie, inasmuch as it retains its nutriment all the year round. Among other feed-grasses are several varieties of bunch-grass, and in the low lands a native blue-grass and the spangle-top, which latter makes excellent hay.

THE NATIVE TREES.

The Nebraska prairie is not bare of trees; in fact, the native trees furnish a large list. The river-bluffs are clothed with them, and the banks of the streams. There are two kinds of buckeye, two of maple, two of locust, four of ash, three of hickory, eleven of oak, twelve of willow (eight species being shrubs), three of poplar, one sycamore, black walnut, yellow pine, white cedar, and red cedar. The shrubs include common juniper, pawpaw, prickly-ash, five sumacs, red-root, spindle tree, six species of plum, six of currants and gooseberries, five dogwoods, butter-bush, buffalo-berry, red and white mulberry, hazelnut, and beaked hazelnut. Cedars are found on the islands of the Platte, and along the Loups and the Niobrara there is a goodly quantity of pine. But the point is here: this list of trees is proof that trees flourish on the prairie, and that as much timber as is needed for all uses can be raised on the farm.

The prairie, in its natural condition, presents the aspect the preceding pages sketch—an untilled garden-land, furnishing plenty for its wild denizens, for man and beast. Looking at it in this year (1879), it is a marvel how Fremont and others could have come to regard it as a desert. Nevertheless, they did so regard it; and the nation up to the year 1850 little knew of the rich domain it possessed in the trans-Missouri region —a region which is to be the great grain- and stock-producing area of the continent.

THE HISTORY OF NEBRASKA.

The white man knew Nebraska more than twenty-five years ago. Adventurous French trappers explored its wastes and fraternized with the Indians, and the conditions remained the same when Astor's American Fur Company collected the furs of the region. This company established trading-posts, the first of all being at Belle Vue (between Omaha and the

Platte River), which was under the charge of Colonel Sarpy, a member of a French family well known on the frontier, and himself noted for his enterprise, sagacity, and courage. It matters little to speak of these times, except that when men see a great river it is natural to desire to know its birthplace in the mountains, and it was in these beginnings that Nebraska had its origin. Across its prairies was the way to the west coast and to Utah. Many an "Argonaut"—as the "Forty-niners" are called—never saw the sea until he reached the Golden Gate by way of the prairie, and the Mormon roads are still traceable across the Plains. It was the establishment of frontier forts that was the next stage in Nebraska's progress. The people there had to be fed and clothed, and the freighting system came into being. To meet the needs of this overland trade, there had to be ranches on the way where supplies could be obtained; and hence at convenient places they were established. By one means or other the land was known to the outside world about 1850, and there was a crowd waiting on the Iowa and Missouri side of the Missouri to "jump" the river as soon as the Territorial act authorizing settlement was passed and proclaimed in 1854. But from Cedar county in the north to Richardson county in the south there was no belief anywhere that any land except the Missouri bottoms was worth occupying; and a decade went by and there were but few farms opened ten miles west of the river, the balance of the State being really the hunting-grounds of the Indians. In 1864, however, the Union Pacific Railroad was commenced from Omaha, and in 1869 the Burlington and Missouri River Railroad from Plattsmouth; and since then these railroads have been the largest factors in promoting Nebraska's prosperity. In 1867 the State was admitted to the Union, and at that time Lincoln, on the prairie, was located as the capital, and is now, besides being the seat of government, the second city in the State, with a population of ten thousand, while Omaha's population numbers twenty-five thousand.

This is a brief statement of the dates which go to make up the items in the short history of Nebraska. To fill up the outline sketched would require a book. In brief, the State has become a white man's country. The Indians have yielded possession, the Pawnees quitting their reservation, which has become Nance county, and the Otoe Reservation also is being settled up everywhere. In the agricultural part of the State the traveller meets with splendid farms, and, in the grazing-region west, enormous herds of cattle. The reasons for the prosperity of the State will be of interest to those who are contemplating moving West, and the principal of these may be briefly stated.

THE GREAT FOOD-BELT OF THE CONTINENT.

Men cannot make bread of sand, and so they do not settle in deserts. The United States cover twenty-three degrees of latitude—away to the frozen North and down to the semi-tropic South. But, with all this choice, from the beginning of Western settlement the great current of movement has been within a central belt five or six degrees in width, and "nearly corresponding with the latitudinal length of the State of Illinois, which lies between 36° 56′ and 42° 30′." The proof of this is furnished by the census of 1870, which shows—

	Population.	True Valuation.	Wheat, in Bushels.	Corn, in Bushels.	Immigrants born out of U. S.
11 States and 3 Terrs. in latitude of Illinois........	14,019,314	$12,729,954,998	117,870,054	334,137,865	2,144,000
10 States, larger half in latitude of Illinois............	13,211,389	13,105,750,967	104,378,646	240,623,912	2,524,538
Country wholly out of latitude of Illinois............	11,327,668	4,140,075,345	55,496,926	186,182,772	898,068

The foregoing table demonstrates a truth most important to be remembered by those who are contemplating a change of base. This is the belt in the United States in which industry obtains the most certain and highest rewards. It is temperate in climate, and a man can here work up to his best. The land is fruitful, and bears in greatest abundance those products which are necessaries of life, and which have value accordingly. "South of Illinois," writes Dr. Butler, "it is too hot for wheat; north of it is too cold for corn. Accordingly, in the latitude of Illinois—that is, within three degrees north and south of the parallel of 40°—American agriculture can be more diversified than anywhere else. Farmers there are not dependent upon any single staple, but raise crops so various that a season which is pernicious to one is profitable to some other. Theirs is the threefold cord which is not quickly broken.

NEBRASKA THE BEST PART OF THE BELT.

The marvel of Nebraska is, that the progress of Illinois is here excelled. Consider the following figures: At the beginning of 1856 the population of Nebraska was 10,716, and at the close of 1875, 259,912, which was a twenty-five-fold increase in twenty years. In 1810, Illinois had a population of 12,282, and in 1830, 157,445, a thirteen-fold increase. These figures exhibit the two States in the first period of growth. Starting with about the same population, Nebraska doubles upon wonderful Illinois in the course of twenty years. The reason is, that in

Nebraska the farmer has Nature fully on his side—a fact further manifested when the productions of the State are considered. Corn, the king of grains, is bountiful in production, and it is not unusual for seventy pounds of ear to shell sixty to sixty-three pounds, or four to seven pounds over the standard, the general average of production, with fair cultivation, being fifty to sixty bushels per acre. Numerous varieties of wheat are grown, the yield being fifteen to twenty-five bushels per acre; of barley a fair yield is thirty to forty bushels; of rye, twenty-five to thirty bushels; and of oats, forty to fifty bushels. Flax returns about twelve bushels per acre, and tame grasses—alfalfa, or California clover, ordinary red and white clover, Hungarian grass, timothy, millet, blue-grass, and orchard-grass—take well to the soil and climate and cut heavy crops of hay. The country which is good for corn, good for small grains, good for grass and hay, and has a favorable climate, must be the location for stock-raising. It is live-stock the civilized world most wants, and in live-stock the farmer finds wealth. If a settler opens a farm in the agricultural part of the State, mixed farming is the best, and he should therefore combine grain- and stock-growing. If a man goes forth to the great pastoral region, then of course the industry he will follow will be that of herdsman or flock-master; but be he where he will in Nebraska, cattle, horses, sheep, and hogs are what he needs to have about him. There is in Nebraska a wide field for profitable horse-raising, and except the few colts which farmers raise the field is unoccupied, and large numbers of horses are annually imported into the State, which could all be raised here at much less cost than in the States whence they are imported and sold in Nebraska at from eighty to one hundred and twenty dollars each. The farmer who wants to engage in horse-breeding should come to Nebraska. He will find the broken prairie—land which, because it is not the best land laid out for the plough, sells at from three to four dollars per acre—the best adapted for the purpose. In these lands draws frequently come in from all sides toward a bottom, and wind-shelters are afforded from whatever direction the wind may blow, and water also is ever abundant. In a location of this character a man may establish himself, put up necessary shelters for his stock at a cheap rate, breed horses or mules, and find a ready market in the State and outside of it, for the freight is an exceedingly small percentage on the value of a good horse, and the best horses can be raised in Nebraska at a much less cost than in Kentucky. For feed, horses have the native prairie grasses, which are most excellent for both pasturage and hay, and corn, oats, rye, and barley are grown in great abundance and of most excellent quality.

THE CATTLE-FARM.

Cattle should be upon every farm—as many as the land will carry or the owner's means afford. Away from the great ranges it is best to have fairly good stock, which it should be the farmer's aim constantly to improve. It will be long years before there are too many beef-cattle in the world, and the market for them is as wide as civilization. Let the reader consider the price of beef in the Eastern markets and in England, and contrast that with the price at which cattle can be raised on the Nebraska prairie. In three years, with good stock, the Nebraska farmer can have a steer to weigh fifteen hundred pounds, and he is amply paid selling at three and a half cents per pound. Under conditions like these there is the possibility of an immense trade with the East and with England, though at present Chicago can absorb all of Nebraska's surplus. Improvements in cattle-cars and in shipping arrangements, however, will extend Nebraska's sales to the most distant markets, landing stock in good condition in London and Liverpool at most for four cents per pound. As an example of possibilities in prepared meats, an English farmer in Seward county two years ago sent a small parcel of hams and bacon, cured in the English fashion, to the Manchester (England) market. The freight on his small shipment amounted to three cents per pound, and his returns were twenty-five cents per pound, and he was informed that any quantity would be received at that price. The dairy produce of Nebraska may be indefinitely increased. Already a considerable quantity of Nebraska cheese is shipped out of the State east and west, at one cheese-factory in Lancaster county the product averaging four hundred pounds of cheese per head of cattle, and selling at ten cents per pound. In butter-making, dairymen among the hills, where the milk can be kept in a spring-house, are supposed to have had an advantage not obtainable on the prairie. Now, however, "Cooley's Creamer" puts the prairie-dairyman on the same plane as those who live in mountain-regions. The windmill pump, which costs from one hundred and twenty to one hundred and sixty dollars, keeps up a constant flow of coolest water from the recesses of the earth. The cooler is a large box, zinc-lined, with (between the zinc and the outer wood) a filling of charcoal. Placed beside the pump, the stream from the pump fills the box, and the overflow is carried off through a waste pipe, so that it can be used for watering stock. This "spring-house" for the prairie is a simple apparatus, and not costly. But further: all who are acquainted with cattle know that under favorable conditions—and more favorable cannot be found than those of Nebraska

—their increase is marvellous, calculation showing that thirty cows, that would cost, say, twelve hundred dollars, in ten years will develop into a herd worth thirty thousand dollars, allowing ten per cent. for losses and the butter and cheese for the cost of maintenance. This is cattle-farming, of course, in the agricultural region. In the great pastures west the business is simpler. There, as yet, dairy products count for nothing, and it is the increase in the herds—cheaply fed and cheaply cared for—which yields the profit. With the cattle raised in this western half of the State there are good opportunities of profitable trade. Small herds can be selected, brought into the eastern parts, pastured on the way, and wintered on cheap corn and hay; and then they are in splendid condition for the meat-market in the spring. In the farming-region hogs go with cattle; and Nebraska farmers, with their Chester whites, Polands, and Berkshires, have as good stock as can be found in any State. Thousands of men find cattle-raising profitable in Nebraska, and thousands of others may engage in the business with equal success. In the west especially the business is an immense one, but statistics are not readily accessible.

EXPERIENCE OF FLOCK-MASTERS.

Those who devote themselves to sheep speak highly of the results obtained. The sheep in its origin is native to the mountains. It likes the dry, pure air of the uplands and avoids marshes. The lay of the land in Nebraska is therefore peculiarly adapted to sheep. On the breezy uplands, richly clothed with grasses, and in the pure, dry air, they are healthy and vigorous; the experience of Nebraska flock-masters, says the Hon. J. D. Jenkins of Fairmont in Fillmore county, who has had large experience, being that, with good management, sheep return a profit of fifty per cent. upon the investment. The pioneer flock-master of Eastern Nebraska is the Hon. Moses Stocking of Saunders county; and one yearly return he made exhibited on a flock of sixteen hundred and fifty-two merinos—which breed he prefers, though long-wool breeds are now coming to have partisans—a profit of $3495. In Jefferson county, Messrs. C. and P. Jansen—leaders in the Mennonite settlement there—commenced sheep-farming in 1875, purchasing in Iowa and Wisconsin a flock of fifteen hundred fair merino sheep, and in New York twenty to thirty thoroughbred merino rams. Since that time they have introduced new blood into the herd by importing additional thoroughbred rams, and have otherwise improved the flock by selling off all inferior animals and keeping only the best, so that now they have a flock of 2300 high-class merinos. As an indication of the manner in which sheep improve in

Nebraska, they furnish the following figures as the yield of wool per head of the sheep during the several years: In 1876 the clip averaged 7¾ pounds per head; in 1877, 8¼ pounds; in 1878, 9 pounds; and 1879 the enormous figure was reached of 11 pounds and a fraction per head, from which they realized $5060. All through the State from south to north, and away west to the Republican Valley and the forks of the Loup, examples of successful sheep-farming are found, and information regarding them may be obtained by inquirers. It is not too much to say that the fifty million pounds of foreign wool now imported into the United States could all be raised on these prairies.

SUCCESSFUL FRUIT-CULTURE.

When the first settlers crossed the Missouri they would not believe that fruit would grow in Nebraska, and some years elapsed before even experiments were made. They gathered prolific crops of wild plums, grapes, and gooseberries, but they were slow to learn the lesson of Nature, that where the plum-thicket was prolific of fruit the apple-orchard would also grow. There were among the settlers, however, men of culture, intelligence, and enterprise, who knew how to reason and how to act. These were the pioneer orchardists of the river-counties. They planted, and their planting failed; but they persevered, and the result is a brilliant success. Orchards and vineyards crown the slopes of the hills, and Nebraska apples and Nebraska peaches vie with the best produced elsewhere. The success is undoubted, and the reason for the success is the co-adaptability of soil and climate—the peculiar deposits (before described), says Professor Aughey, making the State "a paradise for fruit-culture, especially for the apple, plum, grape, and all the small fruits of the temperate zones."

PISCICULTURE.

One acre of water stocked with suitable fish is more profitable than the best ten acres of land on which the sun shines. The native fish of Nebraska are not of high quality, and there are room and verge enough in the home market for extensive piscicultural operations. There are clear rivers and creeks—in some parts small lakes, and everywhere ponds—in which certain species of useful fresh-water fish can be made for ever abundant. To show how fish will increase even when left only to their natural fecundity, instance a consignment of perch, bass, and pickerel which a few years ago were being sent over the Union Pacific Railroad to California. By an accident the car was overturned into the Elkhorn River.

The fry got into the stream, and there they have multiplied amazingly (notwithstanding illegal netting), and spread into tributary streams and ponds. At a late meeting of the Legislature a fish commission was appointed to assist individuals in fish-culture and to protect their interests. Already many persons have established hatcheries.

THE HONEY-BEE AND THE PRAIRIE FLOWERS.

A gentleman who has travelled extensively in the Old World and the New World tasted honey in Nebraska, the product of the prairie flowers, and he said, "This is as the honey of Hybla, the celebrated honey of the Mediterranean countries, with the same aromatic flavor." The honey of the prairie flowers is peculiarly rich, and bees work on the prairie and in the timber-belts on the streams to great profit. To attend to bees—except when the apiary is on a large scale, as it is now and again in Eastern Nebraska north and south of the Platte—is an avocation for the women of the household—one in which they take delight, and one which not only puts money in the purse, but adds to the luxuries of the home. The bees begin to work on the wild flowers among the timber at the opening of spring, but the true honey season of Nebraska is July, August, and September, when the flowers of the prairie—milkweed, heart's-ease, golden-rod, sunflower, and many others—are in their fullest bloom, though by planting rape and other early-blooming honey-flowers May and June are brought into the honey period. In the river-counties of Nebraska large numbers of bees are kept, and in the neighborhood of Omaha alone there are two thousand swarms.

THREE DISTRICTS IN NEBRASKA.

The foregoing narrative describes Nebraska in general terms, and if the reader will study the following figures he will see the progress and prospects of the State further exemplified, but in a different way. A natural division of the State is into three great sections—North-eastern Nebraska, South-eastern Nebraska, and the grazing-region west. Speaking broadly of these several areas, it may be said that the western grazing country is somewhat less than half of the area of the State, North-eastern Nebraska being a little larger than South-eastern, though the present western limit of lands in cultivation is not so far west in the north as in the south. In the south the agricultural area extends almost to the western boundary of the State; and, indeed, in what is now the grazing-region the processes which have made the eastern half arable are in rapid progress.

NORTH-EASTERN NEBRASKA.

Here there are twenty-eight counties, which in 1860 had a population of 10,500; in 1870, 51,088; and in 1879, 108,264. And wealth has increased with the increasing population. Twenty-five years ago settlement began on the Missouri bottoms. On the whole wide prairie there was nothing which civilized man counts as wealth; and yet now the property is assessed at—and assessed values are but as one in three of real values—$30,441,370, Omaha, with its population of twenty-five thousand, contributing several millions. In 1870 the land in cultivation in the whole State was 647,031 acres, but in 1880 in this quarter of the State the figures are 1,168,846 acres. The live-stock now owned by the people numbers 48,963 horses, 4200 mules, 141,281 cattle, 46,769 sheep, and 134,988 swine; and the wheat and corn product for the year 1879 (estimating for certain counties which have not made returns on the basis of the 1878 returns) is 5,804,749 bushels of wheat and 16,297,598 bushels of corn. Of cultivated timber there are 26,744 acres; apple trees, 306,143; pears, 5582; peach trees, 39,584; plum trees, 48,564; cherry trees, 31,734; grapevines, 49,444; and 1104 miles of live hedge.

SOUTH-EASTERN NEBRASKA,

with twenty-seven counties, has a still more favorable record. The population of this section in 1860 was 16,539; in 1870, 71,731; and in 1879, 201,976; and in 1880 the assessed valuation of the property in this section is $40,483,979. The land in cultivation is 1,994,458 acres; the horses number 100,574; the mules, 10,367; the cattle, 199,146; sheep, 70,285; swine, 523,683; while the wheat product (estimating as before for certain counties that have not made returns) is 8,722,105 bushels, and corn 20,698,982 bushels. The acreage in cultivated timber is 62,769, and of fruit there are 967,457 apple trees, 30,445 pear trees, 1,209,957 peach trees, 96,738 plum trees, and 185,485 cherry trees, 158,367 grapevines, and 5497 miles of live hedge.

From the grazing-region west the statistics are not sufficiently complete to warrant their setting forth, though here reside the balance of the population (the census of the State for 1879 gives the total population as 386,410, against 122,993 in 1870, or an increase during the nine years of 201 per cent., which is something unprecedented in the history of agricultural settlement, and most convincing testimony to the excellence of the land), the chief industry being the raising of beef-cattle in immense herds, though in the valleys there is considerable farming, and as settlement proceeds and pioneers push westward the whole State will be devoted to farming.

The figures which are given must show those who want homes in the West that they cannot settle in a better State than Nebraska. There is enough and to spare for all the people, and an accumulation of wealth marvellous in so young a State. Those who have money to invest largely in stock may go to the grazing plains; those whose means are more moderate should take a farm; while those who propose to engage in trade and manufactures will find openings in one or other of the towns. Nebraska is, and will always be, to a great extent, an agricultural country, deriving its wealth from the soil. But there is money invested in manufactures of various kinds, and there is room for more, especially in the manufactures which are connected with agriculture, as wagon- and carriage-making, agricultural implements, starch, pork-packing, and dairy products. A large field is indeed open, which only needs capital and intelligence and skill to develop.

THE CENTRE OF THE RAILROADS OF THE COUNTRY.

The railroad system of Nebraska permeates the State and strikes out over the continent, east, west, north, and south, to the seaboard. Wherever there is a market for the surplus products of the State, there are railroads to that market. No State at Nebraska's stage of growth has ever before had such railroad facilities for the development of State commerce and foreign trade, through the Pacific roads west and through the gate-cities of Omaha, Plattsmouth, and Nebraska City east and southeast. Nor is this all. A new era of railroad-building seems to have come to the State, and more railroads will still be built, until there shall not be a corner of it which shall not be penetrated by the iron way, the modern highway of nations, and bring all the people, as will be seen is largely the case at present, into direct communication with Lincoln, the State capital.

SCHOOL SYSTEM OF THE STATE.

Nebraska provides liberally for the education of the young. In the first place, there is the common-school system, which penetrates everywhere. There is a normal school for the training of teachers at Peru, in Nemaha county; and at the head of the State system is the University at Lincoln, where the higher education, after the payment of matriculation-fees, is free to students. The educational endowments, as shown by the statistics presented to the Legislature in January, 1879, comprise common-school land, 2,443,148 acres; agricultural-college land, 89,452 acres; university land, 45,119 acres; normal-school land, 12,800 acres; and the school fund in money, $2,120,182; the revenue applied to common school purposes for the year 1878 amounting to $629,068. The common schools grow with the State, as the following table will show:

GROWTH OF THE SCHOOL SYSTEM.

Years.	Av. No. days of School.	Districts.	Children.	Teachers.	Value of School Property.
1870	46	797	32,789	536	$178,604
1872	79	1410	51,123	1512	817,163
1874	88	2215	72,991	2735	1,553,926
1876	90	2513	86,191	3366	1,585,736
1878	92	2690	104,030	3730	1,806,466

Besides the public provision, the Episcopalians have a college for girls, Brownell Hall at Omaha; and for boys, Bishop Talbot College at Nebraska City. The Catholics have a noble college at Omaha; the Congregationalists, one at Crete, in Saline county; and the M. E. Church is about to erect a college at York in York county. The State institution for the deaf and dumb is at Omaha, and for the blind at Nebraska City. The sum of the account is, that every child in Nebraska has within reach a sound education which shall fit him or her to perform the duties of life.

STATE INSTITUTIONS.

The capital is at Lincoln, and work is just now being commenced upon an addition to the present State-house, the Legislature at its latest session having voted $60,000 for the purpose. The University, a fine Italian building, is also in Lincoln, and the State Insane Asylum is about two miles away, located in a charming country; the penitentiary, which is a castellated structure, is about one and a half miles from Lincoln; the Blind Asylum is at Nebraska City, and a Deaf and Dumb Institute at Omaha; and a reform school is to be erected at Kearney.

OPPORTUNITIES FOR ACQUIRING LAND.

There are millions of acres of government land yet open to pre-emption, homestead, and timber-culture entries in Nebraska, but those who want these will have to go considerably west. All over the State the public-school lands are offered for sale and lease. The quantities are named in a preceding paragraph, and information with regard to them may be obtained by writing to F. M. Davis, State Commissioner of Public Lands and Buildings, at Lincoln, Nebraska. The minimum price at which these lands are sold is seven dollars per acre, on twenty years' time, at six per cent. interest, and leases are on appraised values. During the years 1877 and 1878 the lands sold were 26,819 acres, and leased 100,918, and the sales and leases during this year are doubling upon these figures.

UNION PACIFC RAILROAD LANDS.

For detailed information about these lands written or personal application should be made to the Land Commissioner U. P. R. R., Omaha, Nebraska. This company owns three million acres of fertile lands in Central and Western Nebraska, which are sold for cash, or on a credit of ten years at six per cent. interest, with gradual payments of principal and interest. The prices range from two to ten dollars per acre, on ten years' credit, "according to quality, location, timber, and nearness to market;" and a deduction of ten per cent. from credit prices is made to cash purchasers.

BURLINGTON AND MISSOURI RIVER RAILROAD LANDS.

For detailed information about these lands address or apply to the Land Commissioner B. and M. R. R., Lincoln, Nebraska. This company has remaining of its land grant of more than two million acres about one million acres south of the Platte River, in the rich south-eastern section and in the north-eastern section north of the Platte. The north-eastern lands, of which there are about six hundred and fifty thousand acres, range from one to six dollars per acre, on ten years' time, with discount from these prices on six years' and two years' credit, and for cash. The balance of the B. and M. lands in South-eastern Nebraska are sold at from three to ten dollars on ten years' credit, with discounts off for cash or shorter time of credit. The reader will perceive that there are still opportunities to acquire homes and farms in Nebraska in United States government land, State land, and railroad land, free or on exceedingly low terms; but the progress made by the State, as its history demonstrates, is proof enough that only a short time will elapse before the era of cheap lands is closed for ever.

HEALTH.

EXTRACTS FROM AN ARTICLE BY GEO. TILDEN, M. D., OF OMAHA.

IN a new State the subject of malarial diseases is one of vital importance. Prominent among the causes and conditions of this class of affections may be mentioned a fertile soil, luxuriant vegetation, and poor drainage. Our soil is extremely rich and our vegetation most abundant, but the other condition, poor drainage, is not present. . . . .

The atmosphere is very pure and dry, and prevents the pernicious miasmatic effects which usually result from decaying animal and vegetable matter. Nebraska has less malarial disease than any Western or Southwestern State. Indeed, cases of this class are very rare, and when they do occur are mild in character and yield very readily to simple treatment.

In regard to epidemics, I think I may very safely assert that there never has been in this State an epidemic of any kind; even scarlet fever and measles have never appeared here epidemically.

The vital statistics of the United States for the year 1870 set forth a fact of the highest importance to us relative to consumption. These statistics, together with our own, show with mathematical certainty that this is the most favorable State in the Union for the prevention, control, and treatment of this great scourge. Here, in proportion to the population, Consumption shows her smallest bills of mortality. But this authoritative statement will not surprise in the least those who have resided here for the last ten or fifteen years and given any attention to the subject. They have stoutly contended that this is the most favorable spot for those predisposed to this malady; and time and observation and the faithful record of facts have more than confirmed their most sanguine expectations and assertions. . . .

It matters not how warm and oppressive the day may be, the night is cool and delightful. Sleep, the great restorer of the mental and physical energies, is never disturbed by an oppressively warm atmosphere. In fine, the atmosphere of Nebraska is very pure, clear, dry, elastic, and bracing, and promotes in a high degree mental and physical activity and development. Take the seasons as they come and go, and average them, and no State can make such goodly promises as this for health, development, and longevity.

NEW MEXICO.

BY GEN. LEW WALLACE, GOVERNOR.

THERE are three interests in New Mexico worthy consideration—the mineral, the grazing or pastoral, and the agricultural—and they may be said to constitute the resources of the Territory, as manufacturing is confined almost exclusively to jewelry, of which very exquisite work in filigree is produced in Santa Fé, mostly from gold and silver native to the Territory.

AGRICULTURE.

Agriculture in New Mexico is yet in its primitive condition. The wooden plough of the Mexican fathers holds preference with the majority of farmers. Development is barely sufficient to serve anticipation. Corn, wheat, oats, barley, and the table vegetables generally are raised with a view to the home market, which is quite limited. Corn is produced best in the valleys along the banks of streams. I have seen wheat- and oat-fields six and seven thousand feet above the sea-level as rich as any in Illinois and Minnesota. It is not possible to state even approximately the area of such productions. All irrigable lands, wherever they may be in the Territory, belong to the productive or farming class. The depth of the soil is something wonderful. With rains as in the Mississippi Valley, the results of intelligent labor would astonish the world; as it is, no one thinks of land for cultivation except it be irrigable. In this sense water is king.

THE RIO GRANDE VALLEY.

The river Rio Grande gives name to the lowlands along its shores, which, running north and south nearly four hundred miles, have an average width of five miles. The soil is light, warm, sandy, and surpassingly rich. Putting the soil, river, and climate together, the Rio

Grande Valley is more nearly a duplication of the region of the Nile than any other of which I have knowledge.

Not more than one-tenth of the soil is actually occupied. A considerable portion of it is unfortunately covered by grants claimed or confirmed. Fruits are favorite articles of production. Peaches, pears, apricots, apples, grapes succeed admirably, though in most instances, and notably with exception of the grape, the varieties are the poorest. Indeed, the word "variety" can scarcely be applied to them. The grape is free from disease, and affords wines which are in growing demand abroad. With skilled labor and capital to enable manufacturers to carry their wine a sufficient time, no portion of the country, not excepting California, will surpass this valley in this line of production.

In all instances, and whatever the crop, the dependence of the farmer is upon the river, which, when irrigation is thoroughly systematized, will be found furnishing an ample supply of water. Iron piping will then take the place of the open acequias and the area of planting be vastly increased.

The wonder is that more attention has not been given this part of the country by people East seeking investments in landed property. One gentleman I have heard of near Mesilla, in Doña Ana county, who clears annually quite ten thousand dollars from the fruit-products of twenty acres. Paying vineyards are also to be found at Bernalillo and Albuquerque.

THE PECOS RIVER VALLEY.

This valley, deriving its name from the river Pecos, is not so thickly settled as its rival of the Rio Grande. The lands there are almost entirely occupied for grazing purposes. A good supply of water is obtainable from the Pecos River and its tributaries, and every inch to which it can be carried will respond richly to the plough. Its advantage is in the absence of land grants, and, like the Rio Grande, it is blessed with a climate most healthful and delightful.

THE MESILLA VALLEY.

The beautiful region bearing this name should have a special mention by itself, but, to economize space, I have thought best to treat it as a part of the Rio Grande Valley. Agriculturally considered, it is the same.

CATTLE- AND SHEEP-GRAZING.

Off the Pecos and Rio Grande Rivers there are vast tracts of table-lands, called *mesas*, which are to be distinguished from the mountains and valleys. They are too high for irrigation, yet they yield grasses of the richest kind for subsistence of cattle and sheep—grasses that cure themselves in the standing stalk.

The variety of these mesa-tops permitting, as on the mountain-sides, the growth only of grass and cedar and piñon trees—the latter invaluable for shelter of animals, particularly in winter—will for ever limit their use to grazing. The ranges they offer cannot be excelled for that purpose; adding them to the ranges on the mountain-sides, the vastness of accommodations for feeding cattle, sheep, and horses can be appreciated. The inexpensiveness of the mode is well understood.

The old dispute as to which is the more profitable, cattle-raising or sheep-raising, is yet unsettled, each having very intelligent and practical adherents.

That New Mexico has not her proper place in the meat- and wool-markets of the United States may be set down to causes now very soon to disappear. They are—first, difficulties with Indians; second, the inferior quality of the stock, no attention whatever having been given by owners to importation of blooded animals; third, other localities, claiming original shipments, have been largely credited with the products due this Territory.

I regret not having statistics to enable me to give the quantity of wool produced or the number of cattle and sheep in ownership. The results in either case would be astonishing to those who know little or nothing about New Mexico, who are in the habit of regarding it as chiefly desirable on account of its climate. The increase of both sheep and cattle is constant, and the improvement of breeds is becoming more and more noticeable.

THE MINERALS OF NEW MEXICO.

Notwithstanding the adverse judgment of Lieutenant Wheeler in his very able report for 1876, I am of opinion that New Mexico will come quite up with her neighbors in the yield of precious metals. A variety of causes have heretofore contributed to prevent her thorough exploration for such wealth. Both Mexicans and Indians are indifferent to discoveries in this line; in fact, the latter yet make it a capital offence to show a prospector anything of the kind. A Pueblo might be induced to part with his eye-teeth; no inducement could prevail upon him to take a white man to a mine; and in the hands of these people the golden keys have been held in tight grip ever since the expulsion of the Spaniards. Hence the ignorance prevalent with respect to the mineral riches of the Territory, and the heretofore utter failure of attempts at their development. It is absurd to say that an arbitrary geographical line marks a silver or gold limit. With productive mining districts on the south, west, and north, and with geological formations identically the same, the best of the scientists will be hard put to to give a reason why New Mexico is barren, and Chihuahua, Arizona, and Colorado are rich beyond computation, in gold, silver, copper, and galena. And now every day is settling the question. The genuine prospector is here, and come to stay. He is in the mountains everywhere. Bugbear stories do not stop him, neither do land grants, rattlesnakes, bears, or painted Indians. He has discovered and adopted the *burro* as a friend, comrade, and servant. The consequence is new "finds" every day in out-of-the-way places. All mining history is divisible into two parts—the era of prospecting and the era of production. In New Mexico we have just entered upon the former; five years will bring us to the latter. What can be had cheap to-day will then cost a fortune. Men seeking mining investments are welcome to the hint. There are more traces and signs of ancient mining in New Mexico than in either Colorado or Arizona.

Already enough is known to warrant the assertion that the Territory is well stored with gold, silver, iron, copper, lead, zinc, mica, gypsum, coal, marble, precious stones, and stone of every variety for building.

RESOURCES OF NEW MEXICO.

BY L. BRADFORD PRINCE, CHIEF-JUSTICE OF THE TERRITORY.

IN writing a general letter to old friends on Long Island on this subject last spring, I said that there was no opening at all for men without some means—that mechanics, clerks, and laboring-men could find no adequate field of labor. This was based on the fact that the wants of the native population are generally few and easily satisfied, that as a rule they are far from rich, that they have little desire for new houses, and that whatever building was progressing was in adobe, with which our mechanics were unacquainted; and, as to clerks and laborers, that there were more men than places already. This was entirely true then, but the circumstances are since somewhat changed by the advance of the railroad. The Atchison, Topeka, and Santa Fé line has now not only reached Las Vegas, but is pressing with all the speed that enterprise and full resources can impart to the Rio Grande, which it is expected to reach by Christmas. It brings with it a new and active population and a great change in conditions. Las Vegas is to-day one of the busiest towns in the country—full of active, bustling, restless American life. A hundred and fifty houses have been built in six weeks, and there is a constant struggle now to procure mechanics for rapid future improvements. The haste to build may be exemplified by the fact that I counted twenty-four carpenters on the roof of one half-finished hotel, all busily engaged at the same time in shingling.

These circumstances of course present a field for mechanics, and I believe that the advance of the railroad will cause this field to increase rather than diminish for the next two or three years. Carpenters, masons, painters, and plasterers can all find employment in considerable number; but especially carpenters, as houses must be built, but painting and plastering are matters of not such immediate necessity. A few cabinetmakers, who can make and repair the furniture suitable to a new population, can also find profitable employment. These, I think, constitute all the classes of men without any capital who would do well to come to New Mexico at present. There is no lack of common laborers or of young men fitted to be store-clerks.

And now for the branches of business in which those with some money can profitably engage.

SHEEP-RAISING.

I mention this first, because it is the most important industry of the Territory. It extends from the extreme east on the head-waters of the Canadian River to the San Juan country in the far north-west. The sheep of New Mexico are to be counted by the million, and yet there is plenty of room for new enterprises both as to number and quality. To commence the business properly requires a capital of five thousand dollars, which will buy two thousand sheep and provide for all necessary expenses until a regular income is derived from the flock. No business can be safer, surer, or more healthful; but, like all others, it requires work and attention, and if any one thinks that sheep-raising is to be conducted profitably by living in town and having flocks roaming the prairies under irresponsible herdsmen, without personal attention, he had better remain at the East.

CATTLE-RAISING.

An immense field for this branch of industry is still open in New Mexico, and it can be surely successful under the same conditions as with sheep-raising. The profits are greater, but it requires a larger capital at the commencement and a longer period before there are returns of income.

FRUIT-RAISING.

The whole valley of the Rio Grande from Santa Fé to Socorro is admirably adapted to fruit-culture, and so are other portions of the Territory. Plums and apricots flourish considerably to the north of Santa Fé, and grapes—of which I will speak separately—to the extreme south of the Territory. It is only within a few years that fine varieties of fruit have been introduced from the Eastern States, but the perfection in which they can be raised here, and the size which they attain, are extraordinary. The flavor of fruits here appears to be much higher than in California. Until now it has been useless to extend the culture largely, as there was no adequate market for the products; but now that there will soon be direct communication by rail with Kansas and Colorado, the valley of the Rio Grande will become the great orchard of the West. Any good fruit-culturist coming now to New Mexico and establishing orchards in that fertile valley, will find an immense market open by the time his trees are in bearing, and cannot fail to reap a profitable reward.

VINEYARDS AND WINE-MAKING.

For years the grapes and vines of El Paso have been celebrated, but this gives but a small idea of the extent of this vineyard-region or of the future importance of this branch of industry. The Rio Grande Valley from Bernalillo down to the Mexican line is naturally a grape-growing region, and vineyards are already in full bearing at all the important points, and at some have existed for more than two hundred years. The finest varieties of both native and foreign grapes succeed admirably, so that raising the fruit for immediate shipment will be a most excellent business within two years, when the railroad shall have made transportation swift and easy. It is none too soon now to arrange the vineyards for this approaching trade, as the demand will be enormous before vines planted this fall or next spring come to bearing. The grape now ordinarily grown, and of which vineyards of full size can be purchased if desired, produces an excellent wine largely used at present in the Territory, and which will no doubt find a market abroad as soon as the railroad is completed. Unless all reports are false, this is the finest vineyard country in America, the climate allowing the growth of many varieties too tender for the North, while the flavor is higher than in Californian grapes. The present native wine is said to carry more than an ordinary amount of spirits, and to produce an excellent brandy at small cost. It is stated by those whose judgment in such matters is reliable that a competent distiller can do a large and profitable business by buying the native wine and distilling brandy therefrom.

MARKET-GARDENS.

While a great proportion of the land in the Territory is adapted to grazing, yet there are beautiful valleys of extraordinary fertility where enormous crops can be raised on small areas. Such are the valleys of Mora and Taos, part of the Pecos Valley, etc. These present just the field adapted to German market-gardeners, for whose products the new hotels and advancing tide of population will make a ready market.

And here I will mention one specific want which a few enterprising persons can soon remedy with profit to themselves and benefit to the community. I refer to chickens and eggs. These are very scarce, no one apparently making it a business to raise them; and any one engaging in the business can find a ready sale for a quantity practically unlimited.

WOOLLEN-MILLS.

Turning from farm-products to manufactures, the most profitable investment in the latter connection would be a woollen-mill. Wool is the great product of New Mexico. It is here in inexhaustible quantities, and at present is all transported East at a very heavy expense to be manufactured. Kansas, Nebraska, Colorado, and New Mexico itself, present a vast market for woollen products, which are now brought from the Eastern factories; so the wool raised here pays a double freight before it arrives at the West again, to be used in the form of blankets, carpets, and clothing. It is obvious that mills on the ground would save all this expense, and that their business could not fail to be profitable. It may be added that in the few manufacturing experiments tried here it has been demonstrated that the native boys make excellent factory-hands.

TANNERIES.

In this land of hides, sheep-skins, and fancy skins there are no tanneries. Everything is sent away for that purpose. The extra freight on the useless weight thus transported is itself a large item. Of fancy skins there is a great variety, including bears, mountain-lions, beavers, red and gray foxes, wolves, minks, etc., all of which when tanned are readily sold and command good prices; but at present they have to be sent long distances for tanning. I know of two lots very recently sent to New York for that purpose, thus entailing the expense of five thousand miles of transportation to and fro. A tannery established here, where the hides and skins could be brought directly to the door, could not fail to be largely profitable, even though the tanning material had to be brought from other places.

BRICKMAKERS.

In various parts of the Territory there is good brick-clay, and from this time forward large quantities of bricks will be wanted. A practical brickmaker cannot fail to be successful.

BANKING.

By far the finest opportunity for an investment of capital, by those who do not wish hard work, is a bank in Las Vegas. A national bank is greatly wanted there, and would be very profitable. The business of the town is already very large, and as an immense section of country is now and must continue to be tributary to Las Vegas, it will undoubtedly increase. The immediate deposits would be considerable, and the opportunities for safe loans are abundant. The lowest bank-rate in the Territory is one and a half per cent. a month; and a careful inquiry as to the success of other banks here and the business condition of Las Vegas leads me to say confidently that no such opportunity for a safe and profitable investment of capital exists to-day in the whole country as in the establishment of a national bank at that city.

MINING.

I have reserved this for the last, as it is probably the most interesting topic of this letter. Almost every section of New Mexico abounds in "mineral," and the amount of gold, silver, copper, coal, and mica within its limits may be called incalculable. I will not enumerate all the localities, but venture the assertion that in less than five years New Mexico will be the great field of American mining enterprise. All that is wanted now is development. The gold-mines of Colfax county are practically useless until the conclusion of the pending foreclosure of the mortgage on the Maxwell land grant sets free the belt of rich mining-lands within its limits. The same is true of gold, copper, and mica on the Mora grant, now in process of partition. These two great grants, together containing about two million six hundred thousand acres, have been standing right in the gateway of immigration into the Territory as a kind of barrier, but the next few months will no doubt see the title of each settled, and this vast extent of land, embracing mineral, farming, and grazing districts, thrown open to American energy and enterprise. All through the Territory excellent prospects exist, but all need development. The placers contain millions of dollars in gold-dust, but in general cannot be worked for want of water, which can only be obtained at considerable expense. By meeting that expense an immense return could be ensured.

The Cerillos silver-mines are in a most encouraging condition, but need capital for development. They are situated on the very hillsides from which the Spaniards extracted unknown millions centuries ago, until the enslaved Indians arose and drove them from the land, and endeavored to destroy every trace of their sufferings by filling up the mines in which they had labored.

At the Cerillos are dozens of claims showing excellent veins of "mineral," but very few of the prospectors have the money with which to sink shafts to the distance necessary for profitable results. Around Silver City and Shakespeare there is much mining enterprise, but everywhere there is a necessity for more capital for development. Reports come daily of rich new discoveries, which can no doubt generally be taken with some grains of allowance; but this much is true, that but a moderate portion of the Territory has been prospected at all, and that the indications are that a short time will develop fields of mining industry which will give profitable employment for thousands of men and millions of capital.

Coal is found in large quantities and of excellent quality in several sections of the Territory. The Atchison, Topeka, and Santa Fé Railroad Company recently bought a considerable section of coal-land belonging to the government, but there is still room for plenty of private enterprise in this direction.

THE PROFESSIONS.

Many professional men, lawyers and physicians, inquire as to the chances for successful practice here. To these I can only say that there is always plenty of professional business for those who are competent and skilful, who obtain the confidence of the community, and who really mean in good faith to labor zealously in their professions. The bar of New Mexico is second in ability to that of few of the States. No one should come with the idea that he is going to find an inferior degree of talent here, but yet there is room for a few more lawyers of the right kind. The same may be said as to physicians; with the addition, that the increasing population of course requires more medical attendance, and that there are country towns of considerable size which at present have no qualified physician.

Thus I have sketched as briefly as I could some of the business opportunities and something of the industrial situation in New Mexico. I shall add here that the climate, which is altogether the finest in the country, will allow thousands of those who are invalids at the East to engage in active business here. Especially to those having weak lungs it presents great advantages. Here they can raise vineyards and orchards if they do not care to risk the roughness of life on a ranche. The medicinal and hot springs at Las Vegas, now under control of the railroad company, which is making rapid improvements, will be a resort giving the advantages of Eastern watering-place life to the families of such residents as desire it before next summer. And—what is perhaps of the greatest importance to those proposing to locate here, and presents a marked contrast to attempted settlement in the Southern States—they will find the native population polite, generous, and hospitable almost to a fault, with no dislike or distrust of newcomers of the proper class, but inclined to welcome good citizens from wheresoever they come. Considering the circumstances of the case, and the character of some of the first Americans who came to the Territory, it is really surprising that so much goodwill should be felt by the so-called "Mexican" population toward the newcomer; but it certainly does exist, and those who choose to make New Mexico their home, and who are entitled to respect and confidence, will find a welcome anywhere in the Territory, and need have no fear of being branded as "carpet-baggers" or ostracized from society.

WYOMING.

BY HON. JOHN W. HOYT, GOVERNOR.

SCENERY.

WYOMING scenery is a subject for poet and painter. One sees much of the poorest of it in travelling over the great Pacific Railroad, and some that is sure to enkindle his enthusiasm. It is much to live in the presence of beautiful and magnificent surroundings, for Nature at her best exerts a most refining and elevating influence. Æsthetic and moral culture is the priceless product of her teaching.

Many a Wyoming herdsman grazes his cattle and many a shepherd watches his flock in the midst of scenery that would challenge the genius of a Turner or Salvator. He is the better for it, and the children who play about his cabin-door and gambol on the bank of the beautiful stream flowing past will be the better citizens for these silent lessons. I cannot here attempt even to locate these glories of the landscape; one finds them on every mountain-side and in nearly every valley. When better known they will make of Wyoming, including that "wonderland" the great National Park, a region of resort for pleasure-seekers from every part of the world.

POPULATION.

A very large proportion of the population consists of former residents of the New England and Middle States. Of the foreign population (not large) the majority are German. In the coal-mines at Evanston and Rock Springs, and the Atlantic City coal-mines, are considerable numbers of Chinese. There are also some persons of this nationality at several of the larger towns along the railway, the whole number in the Territory aggregating four or five hundred.

The great majority of the population occupy the sixty-nine towns, villages, and stations along the Union Pacific Railroad. The remainder are found at South Pass, Atlantic, Miners' Delight, Lander—all in the

GIANT'S BUTTE, GREEN RIVER.

region of the Wind River Mountains; at Centennial, Douglas Creek, Snowy Range, and other mining points in and about the Medicine Bow and Seminole Mountains; at the several military posts, in the settlements on the Bear River and its tributaries in South-western Wyoming, and on numerous isolated ranches throughout the southern and middle portions of the Territory.

The two great branches of industry are the pastoral and mining. The bulk of capital employed is invested in live-stock, though much of the population and a good deal of the mercantile business are in some way connected with the mining industry, manufacturing, and the business of transportation. The Pacific Railroad Company alone has on its pay-rolls and connected with its extensive operations—machine-shops, rolling-mills, stations, and mines included—quite a percentage of the laboring population. These of course occupy the towns and villages along the line.

Of the capitalists engaged in the stock-business and mining, very nearly the whole number also live in the towns, even though their mines or ranches should be two or more hundred miles in the interior. The herders, and they who, as foremen, have immediate oversight of the herds and flocks or mines, live on the ranches or in the camps of necessity, but the proprietors, with few exceptions, reside upon the railway, and with their teams go and come as interest demands. In the towns they are the men who, with the merchants, prominent men of the trades, and professional men, mould society and govern in public affairs. Hence it is well for the Territory that they are almost universally men of character, intelligence, and foresight; men who, having the beginnings of fortunes at the East, have come out here to enlarge them more rapidly than was possible there; men of former means and position, who during the financial storms of these recent years suffered partial wreck and sought a field wherein to recuperate their failing fortunes; young men, members of first families, who feeling the pinch of close quarters in New York, Philadelphia, and Boston, and desiring to breathe the freer air of the great West, have taken a sum modest or large as convenient, and are here for the threefold advantage of increase in wealth, invigoration of health, and the indescribable charms of a frontier-life under sunny skies and in the midst of sublime surroundings; ambitious graduates of Dartmouth, Yale, Harvard, and other colleges, who were willing to postpone entrance upon their life-pursuits until they had first felt the inspiring touch of Nature and laid a foundation for future independence; men also of special culture in literature or science, who, for the time at least, have left the unremunerative life of research, that they may divide a few years of time between the pleasures of private study and the building of a little fortune. All these are here, and for the greater part are realizing their most sanguine expectations.

The other classes are common to all communities, though an unusually large proportion of those who compose them are characterized by a special energy, tact, and enterprise.

As a matter of simple justice to a people who are still suffering, in the judgment of a remote public, for the sins of unworthy forerunners, whom they long since succeeded,—for this reason and none other I deem it proper to represent the present population of Wyoming as being especially characterized not only by courage, keenness, enterprise, and energy, but also by a most commendable love of good order and by a liberality of sentiment rarely found in any community.

REPORT OF THE SURVEYOR-GENERAL,

EDWARD C. DAVID.

GENERAL DESCRIPTION.

THE area of Wyoming is 97,883 square miles, of which 9,000,000 acres are surveyed into sections and 42,638 acres are improved. The real and personal property amounts to $20,000,000, the population is 30,000, and the towns and villages number 69. There are extensive forests, coal-fields, gold-bearing lands, and mines of silver, copper, iron, graphite and sulphur; also extensive deposits of soda and inexhaustible springs of petroleum. Minerals, timber, and stock constitute the principal resources. A large supply of cattle, horses, sheep, and wool is sold in this Territory or shipped to the East annually. The pure air, dry climate, mild winters, and nutritious grasses render the advantages in stock-raising unrivalled, and it is becoming a great source of wealth to the settlers. The cattle feed and fatten upon the short but nutritious bunch- and gramma-grasses of the Plains in winter and summer, without shelter, as has been proven during many past winters. The favorite wintering-ground of the herders and shepherds is along the east slope of the Laramie Mountains, at an altitude of about four thousand five hundred feet above sea-level, and their herds are generally healthy and fat even in winter. The annual loss in cattle, from all causes, is only two per cent., and the cost per head for keeping a herd of ten thousand is not more than one dollar. A profit of one hundred per cent. has been realized in investments in cattle, and the profits are never less than twenty per cent. Butter and cheese are beginning to be extensively made for the home supply. The number of cattle in Wyoming is 300,000, and yet the wide pastures in Northern Wyoming are unoccupied, though as large as Pennsylvania, and a choice portion of the Territory. Here the valleys are productive and beautiful, and the meadows are of surprising richness and almost endless succession. Thousands of square miles in the valleys of Powder River and its branches are found to be susceptible of producing all the cereals with irrigation, and in many places without irrigation in favorable seasons. For more than one hundred miles there is a succession of crystal trout-streams, fringed with timber. The late occupation of this region by the Indians has prevented it from being sooner settled. The number of sheep in Wyoming is 200,000, and they are often wintered by grazing. The number of horses is 20,000. The North Platte basin contains 8,000,000 acres of pasturage, with lasting streams and good shelter in the bluffs and cañons; and this area would feed 8,000,000 sheep, yielding 4,000,000 pounds of wool, worth $6,000,000. The Laramie Plains, nearly one hundred miles wide, and once the favorite resort of the buffalo, are now occupied by herders and shepherds in all seasons, and here they are near the great forests of pine and the Union Pacific Railroad, and settlers can obtain iron ore, white marble, building-stone, limestone, and fire-clay. The shipment of cattle increases largely every year, and many will be required for the Pacific slope and for the home demand. The quality of cattle has been greatly improved by importing thoroughbred Durham stock.

The valleys and sloping plains in Northern Wyoming are only of three or four thousand feet altitude, and will prove more desirable to the farmer and stock-raiser than the higher plains along the railroad.

CLIMATE.

The climate of Wyoming is very salubrious, and the impression among the inhabitants of lower altitudes that it is hyperborean and chilled by deep snowdrifts for half the year is erroneous. The mean temperature at Fort Laramie for twenty years has been 50°, the annual rainfall eighteen inches, and the snow, which is light and soon disappears, was of the same annual depth. From observations by army officers at Fort Laramie and Cheyenne, from 1855 through a period of seventeen years, it is proven that these localities have a mean annual temperature corresponding to that of Middle Pennsylvania, Ohio, and Indiana, and that the annual and monthly ranges of the thermometer are more moderate than in those

States. The rainfall seems to range from five to nineteen inches per annum. The force of the wind is diminished greatly by the mountain-elevations. From 1850 to 1855 the average temperature was 49°, the same as at Cheyenne since 1871. Army surgeons and physicians here pronounce Wyoming one of the most healthful portions of the world. The air is light and pure, with sufficient oxygen to exhilarate the nervous system. The thermometrical changes, though sometimes sudden, are of short duration. Fort Russell in 1869 gave 55°.78½ mean temperature, with cool and bracing evenings and mornings during the summer. The isothermal line of 50° annual mean temperature, from Burlington, Iowa, passes through Fort Laramie and thence to Puget Sound, bearing steadily north of west from the Mississippi. Strong and frequent winds in fall and winter are an objectionable feature in the climate, but they are not so prevalent in the mountain-valleys, and never increase to a hurricane, as in lower countries.

TOPOGRAPHY.

The general elevation of the plains and valleys of Southern Wyoming is from five to seven thousand feet above the sea, and the mountains are from one to four thousand feet higher. The altitude of Pine Bluffs is 5026 feet; Cheyenne, 6041 feet; Sherman, the highest point on the railroad, 8241 feet; Laramie City, 7123; Medicine Bow, 6550; Carbon, 6750; Fort Steele, 6840; Creston, 7030; Green River, 6140; and Wahsatch, five miles west of the Wyoming boundary, 6879 feet. The Union Pacific Railroad, on which the above-mentioned towns are important stations, is the chief resource for transportation over the 488 miles of its length located in Wyoming, and has an average grade of only four feet per mile. The Laramie, North Platte, and Green Rivers flow through a region supposed to have once been the bed of fresh-water lakes, and now producing but a sparse growth of vegetation, mainly artemisia or sage-brush. Bear River, rising in the Uintah Mountains, runs north in a monoclinal valley; and these rivers, with their tributaries, drain the south half of Wyoming. The north half, sloping north and east, is drained principally by Wind River, the Big and Little Horn, Tongue, Powder, and Cheyenne Rivers—all, except the latter, being confluents of the Yellowstone.

The Wind River Mountains in the north-west constitute the watershed of the Yellowstone on the north-east, and of Green and Snake Rivers on the south-west, and culminate in the Three Tetons and Fremont's Peak, the latter 13,750 feet high. The Big Horn Mountains are in the central portion of Northern Wyoming, and their highest peaks rise above the snow-line. The Carboniferous limestone resembles the older strata, in which are found the silver and galeniferous ores of Utah. The Triassic sandstone contains salt and gypsum. The coal-fields of Wyoming are in the lower Tertiary beds, and hematite iron ore two to fifteen inches thick is found in the same strata.

COAL.

The mineral resources of the Territory are vast and varied, and of these coal is the most important. Evanston produces 125,000 tons annually, Rock Springs 144,000, and Carbon 75,000. Coal is found in the Medicine Bow Mountains, Laramie Peak, Separation, the Big Horn Mountains, Rock Creek, Fort Fetterman, Black Buttes, Hallville, Point of Rocks, and at many other points noted by the United States deputy surveyors. Most of the mines extensively worked are on the railroad. The Wyoming coal has but little sulphur, and for domestic use is preferred to the bituminous. It resembles lignite, is brittle, but nearly as compact as anthracite, and is used in Nevada for smelting the silver and lead ores. The Evanston coal has the largest per cent. of carbon, and the stratum is twenty-seven feet thick. On the Missouri River the Wyoming coal is preferred to that of Iowa. There are 267,319 acres of coal-lands already surveyed into sections, and in 1877, 275,000 tons were the product of the mines.

Magnetic iron ore, in mountain-masses, yielding seventy-two per cent., is found forty miles west of north from Cheyenne, on the east side of Laramie Mountain, to which an easy railroad grade can be obtained. Red oxide of iron, used in manufacturing metallic paint and the reduction of silver ores, is found, accompanied with strong indications of copper, three miles north of Rawlings, and here considerable capital has been used in paint-works.

GOLD.

The gold-mines on Douglas Creek in the Medicine Bow Mountains, though yielding only $15 per ton of quartz, are profitably and easily worked, and have valuable improvements.

Gold is also found on Rock Creek and in the Big Horn, Wind River, and Seminoe Mountains. The area reported in recent surveys is 31,151 acres of lands containing gold. In the Sweetwater gold-mines the quartz yields $50 per ton, and a choice specimen from the Seminoe Mines yielded $106 per ton.

SODA.

The soda-lakes in the valley of the Sweetwater are about one hundred in number, with areas of twenty to one hundred acres, and contain deposits of sulphate of soda ten to fifteen feet thick, almost chemically pure, having nineteen per cent. of soda and twenty-four per cent. of sulphuric acid, making forty-three per cent. of sulphate of soda. The largest lake has fifty million cubic feet of soda, and one boring of forty feet did not reach the bottom of the deposit. The water containing the salts rises from the bottom and fills any excavation made, thus rendering the supply inexhaustible. The seven million dollars paid by the United States yearly for a foreign article can be earned by these mines, five of which have been surveyed for the claimants.

The hot springs in the valley of the North Platte, at the foot of the Medicine Bow Mountains, have been improved as a resort for invalids, and those near Camp Brown are valuable for their medicinal properties.

There is an oil-spring on the Popo Agie, near the Shoshone lands, of heavy, non-inflammable lubricating oil, which has been surveyed for the claimant, and this oil is preferred by the railroad company. Crude petroleum is also found on Bear, Green, and Wind Rivers.

Three copper-mines surveyed yield ores largely mixed with lead and silver.

FORESTS.

The forests of Wyoming will furnish to the settlers the means of cheap improvement, and they cover an area of ten million acres. Saw-mills at various points are converting the logs into lumber, the annual product of which is 5,000,000, shingles 3,000,000, and laths 1,000,000, besides 500,000 railroad ties and 2,000,000 bushels of charcoal.

The Snowy Range is covered with vast forests of pine, cedar, fir, spruce, and hemlock, equal to that of Michigan; and much of this timber is near the railroad. The Medicine Bow, Uintah, Wind River, Big Horn, Wahsatch, and Aspen Mountains are as heavily timbered, and the streams when full in the spring can all be used for rafting saw-logs, wood, ties, posts, and poles to the railroad. The Big and Little Laramie, Rock, Medicine Bow, North Platte, Bear, and Green Rivers and their tributaries can all be utilized for rafting timber to the railroad and for sawing it into lumber, adding prosperity and wealth to the railroad-stations on these streams, and supplying the wants of settlers, of future railroads, and of telegraph-lines. There are also pine-lands in the Laramie Mountains and in the north-east and north-west corners of the Territory;

350,000 railroad cross-ties, 200,000 cords of wood, 1,000,000 feet of saw-logs, and 40,000 fence-poles were cut in one township, and yet this amount of depredation only consumed one-seventh of the dense growth of timber in that township.

Larger bodies of thrifty timber are annually killed by the firing of dry windfalls by mischievous Indians, careless hunters, and lightning than in any other way, and the fires this fall have wasted millions in value.

AGRICULTURE.

Where the valleys can be irrigated, wheat, oats, barley, potatoes, cabbage, turnips, beets, onions, etc. can be raised. The loamy soil is very productive, and oats, barley, and potatoes grow finely and ripen at Laramie City, at an altitude of seven thousand two hundred feet, the potatoes yielding four hundred bushels per acre. Potatoes, beets, onions, asparagus, beans, peas, lettuce, radishes, turnips, carrots, parsnips, cabbage, cauliflower, melons, cucumbers, and squashes are raised at Fort Fetterman.

Several thousand acres on the Laramie River are irrigated by a canal twelve feet wide and twelve miles long. The valleys of the Lodge Pole, Horse Creek, Chugwater, and Laramie River can all be irrigated and made to grow thirty bushels of wheat per acre, and where streams are wanting water can be raised from wells by windmills, as in California, the water being abundant fifteen to thirty feet below the surface, as in the wells at Cheyenne, generally half full of water. A well two hundred feet deep filled to within ten feet of the surface.

CITIES, TOWNS, AND VILLAGES.

Cheyenne, at the junction of the Denver and Union Pacific Railroads, and near the junction of the Colorado Central, is the capital of Wyoming and the county-seat of Laramie county, and has a population of five thousand and an area of one thousand five hundred acres. It has six churches, a large brick high-school building, two large brick hotels, several extensive wholesale establishments, factories for making wagons and carriages and for the manufacture of jewelry, and there are many fine brick residences. It is supplied with water for irrigation by ditches and reservoirs, and by a steam-pump for security against fire. Its trade with freighters, miners, and stock-raisers, and with Camp Carlin and Fort Russell, near it, is extensive, and it is a division station on the railroad. Its average temperature in 1878-'79 was—summer 65°.37, rainfall, 1.88

inches; autumn, 40°.38, rainfall, 0.33 inch; winter, 25°.27, rainfall, 0.24 inch; spring, 46°.63, rainfall, 1.13 inches.

Laramie City has 2000 inhabitants, four churches, a very fine school-building, a public library, a hospital costing $12,000, and the machine-shops, rolling-mill, and large hotel of the railroad. It is irrigated with water from the mountains.

The town of Wyoming has a sawmill for the manufacture of lumber from timber rafted down the Little Laramie.

Carbon is a mining town of 800 inhabitants, and ships a large amount of coal.

Green River and Rawlings—both county-seats—Rock Springs, Hillard, Bitter Creek, Bryan, and Carter are in a coal and iron region, and are important railroad-stations.

Evanston has 2000 inhabitants, a public library, water-supply, and saw-mill; also extensive coal-mines and a thriving lumber-trade.

Hamilton, South Pass, and Atlantic City are near the Sweetwater gold-mines, and have a total of 2000 inhabitants.

The seven forts in the Territory have been sufficient to keep the Indians from depredating to any great extent, though the Utes in North Park, near the south boundary, have lately been hostile. The Shoshones have had a part of their reservation surveyed into sections. The Chinese are peaceable and industrious, but are slow to assimilate with American customs.

GAME.

Buffalo are becoming scarce, but the hunters still find an abundance of elk, antelope, and beaver, besides mountain-sheep, rabbits, squirrels, partridges, grouse, quail, sage-hens, ducks, and geese; also otter, mink, marten, ermine, and musk-rat. Of the predatory animals we have the fox, coyote, wild-cat, lynx, panther, mountain-lion, and bear. Speckled trout abound in most of the streams of Northern Wyoming.

MANUFACTURING RESOURCES.

With abundant water-power in the large streams, with an inexhaustible supply of coal, and with railroad transportation through the entire length of the Territory, railroad iron, wrought iron, and heavy cast-iron utensils and machinery can be made in Wyoming. Lumber, leather, and glass can be manufactured, the white marble wrought, and the soda and sulphur refined.

ADDENDA.

The admirable graded-school system adopted here is similar to that of Michigan. The Territorial library now contains five thousand volumes.

The removal of the Sioux from Northern Wyoming has given fresh impulse to settlement in that fertile region.

MONTANA.

BY ROBERT STRAHORN.

MONTANA, next to the youngest, and one of the largest Territories of the Union, lies between the 45th and 49th degrees of north latitude and the 104th and 116th meridians of west longitude. It is bounded on the north by the British possessions, on the south by Idaho and Wyoming, on the east by Dakota, and on the west by Idaho.

GENERAL DESCRIPTION.

This magnificent empire of the New North-west contains an area of 150,000 square miles, or nearly 100,000,000 acres. Of this, 16,000,000 acres are fertile farm-lands, a more extensive area than is covered by an entire average Eastern State. It contains 38,000,000 acres of unexcelled grazing-lands, a pasture-field alone larger than the great prairie State of Illinois. Its surface, underlaid with stratum after stratum of coal—largely embraced in the grazing and agricultural area already mentioned—amounts to 60,000 square miles, and would not only cover the giant State of Pennsylvania, but would extend over the boundaries of the commonwealths which encompass that greatest of all our Eastern coal-mining regions. And then the Montana forests, 14,000,000 acres in extent, cover more territory than those of the noted lumbering State of Michigan, whose product in this line reaches a valuation of $40,000,000 per annum. Of the mineral wealth the world knows more, for it is a region whose quartz-veins and sluice-boxes have poured out over $150,000,000 in treasure in the first seventeen years of its settlement. In questioning Montana's position and climate, readers should remember that the whole of England, Ireland, Scotland, Belgium, Holland, and some of the most beautiful and fertile portions of sunny France, lie north of the extreme northern boundary of Montana.

THE CLIMATE

is unexceptionable. It would be a broad sweep to claim that it is the best in the United States, but many citizens claim as much for it, and indeed, according to their liking, they are not idle in their belief. There are cold snaps—that is, old Fahrenheit registers the cold at ten to twenty degrees below zero. Yet there is something here, as in all Rocky Mountain regions, that tempers the cold to poor humanity—the rarity and the dryness of the atmosphere, it is said—and one suffers vastly less during the winter season than he would in the Middle States; besides, these extremes in temperature are infrequent, and last winter, being unusually severe, registered scarcely a day at fifteen degrees below, with very few days at all below. Summer is never sultry or hot, while the U. S. Signal Office at Fort Benton revealed *one hundred* more clear days during the last year than were observed at Chicago. With very little severity and infrequent extremes, the weather still has variety enough to prevent complaints of it on that score. Naturally, all concede this

A HEALTHY REGION;

and such it indisputably is. Notwithstanding theoretical arguments against the Rocky Mountain region as a resort for lung diseases, we can positively aver that all lung affections wherein there is no undue loss of capacity are universally benefited in Montana. Asthma or hay fever there is none, though some persons may confound advanced emphyzema with such. For latent or threatened consumption there is unimpeachable evidence in its favor. The rector of St. Peter's church, Helena, gives in his record of interments the cause of death, and in twenty-six cases, his whole service in the Territory, there was but one death by consumption. Malaria cannot exist here, even though men bring it implanted in every bone.

The Missouri River is thoroughly open near Helena a month earlier each spring than at Omaha, with almost unfailing regularity, and signal-service and private observations demonstrate the fact that the mean annual temperature of Helena is the same as that at Santa Fé, New Mexico, the latter being some eight hundred and fifty miles south of Montana's capital.

It is hardly necessary to state that the extreme of heat is never known in all this great mountain-land. The nights, always cool, are proverbial for their absence of disagreeable dews and damps. In the higher mountain-ranges the winters are of course more rigorous, the snowfall far exceeding that in the valleys and the weather sometimes growing intensely cold.

As a resort for invalids and for those constitutionally deformed we can commend Montana just as heartily. Innumerable springs—mineral springs, hot springs, sulphur springs—are scattered about, and so situated that patients can have their choice. That there is virtue in these springs for certain ills, such as are visited upon mankind by the sins of their fathers—for constitutional diseases generally—is beyond dispute.

NATURAL SCENERY.

The tourist, the pleasure-seeker, the scientist, all will find as happy a friend in Montana as the combination dare hope for in the wide world. In the heart of Montana, four thousand miles from the sea, the Missouri River presents such distinctive features of wildness, grandeur, and beauty as are hardly dreamed of by those witnessing its murky and treacherous meanderings through the prairie States. Here clear as crystal, alive with trout, embowered in beautiful pine-forests, the average citizen of Omaha would never believe it the miserable eyesore he left down there, tearing away Iowa and Nebraska counties so unmercifully. Entering Montana from the south, *viâ* the Union Pacific and Utah and Northern Railroads, the tourist hardly crosses the line ere objects of interest to the purely æsthetic taste plead for attention right and left. Then he may wander all over this marvellously beautiful domain—from the Bad Land region of the lower Missouri and Yellowstone at the extreme east to the grandly-rugged and often iridescent summits of the Bitter Root range at the western boundary—and at the close confess in his bewilderment that Nature charmed so irresistibly at different steps it would be difficult to determine which spot to favor in a second ramble.

YELLOWSTONE PARK.

The Yellowstone, its great falls and grand cañons, its enchanting scenery and wild rapids, is renowned the world over. The National Park enchanted land, its lakes and mounts and geysers, "with its variety of phenomena so vastly excelling anything of the kind elsewhere that comparisons are almost ridiculous," is only bordering Montana, but is the Montanians' summer-resort, watering-place, picnic-ground. To the sporting man we have only to announce everything in his field, from the mountain-lion down to the jack-rabbit, from the wild-goose to the sage-hen, from the mammoth salmon to the brook-trout. The rifle, the fowling-piece, and the fly can be utilized on the same excursion.

AGRICULTURE.

Abounding in noble rivers and possessing the best valley-system to be found in the entire Rocky Mountain plateau, Montana also offers many inducements to the agriculturist. Aside from the Missouri, Yellowstone, and Upper Columbia—each navigable and possessing thrice the volume of the Ohio at Pittsburg—there are within her boundaries a dozen rivers presenting features of size and beauty hardly excelled by the finest in New York and Pennsylvania. Among these are the Madison, Gallatin, Jefferson, Bitter Root, Beaver Head, Hell Gate, Musselshell, and Flathead, their valleys ranging in length from one hundred to two hundred miles, and in width from two to twenty miles. Add to these the nearly numberless lateral streams which beautify almost every ravine and valley, and one finds here unlimited water-power and inexhaustible supplies of water for irrigation.

Montana Territory was once known to the world as a rich placer-mining country, but, far away from centres of trade and highways of travel, its great resources lying beyond its gold were unobserved. Those early days saw flour sell at one hundred dollars per sack, while the present demonstrates that it was then, and is now, the best wheat district in the Union. There are well-authenticated cases of enormous yields; among which are these: One field of twenty acres yielded eighty-two bushels per acre; one lot of a number of acres gave one hundred bushels per acre; and one single acre in one instance produced one hundred and twelve bushels. Oats and barley yield almost proportionately with wheat, while vegetables are grown quite beyond anything observed in a long experience in the East.

BIG POTATOES.

General Brisbin, commandant at Fort Ellis, gives statistics of twenty-seven acres of vegetables cultivated by soldiers, which at the prevailing prices in Montana amounted to over seven thousand dollars. This last season, he says, the yield has been one-third greater. At the Helena Fair were exhibited potatoes that weighed four pounds each, rutabagas that weighed seventeen pounds each, and turnips one of which weighed forty-two pounds.

Farms that yield crops as above are worth from five to twenty-five dollars per acre, depending upon the means to market and upon the improvements; but good land may still be had much cheaper, and near enough to market, through the various land acts. Under the Desert

Land Act a settler is allowed six hundred and forty acres anywhere in Montana by paying one-fourth of a dollar per acre on possession, by digging an irrigating-ditch through it within three years, and by paying one dollar per acre by the end of that period. Besides, he is allowed the tract subject to exemption laws in existence elsewhere. Considering the vast extent of territory, no one need entertain a fear that the choicest acres are already located, or that they will be too soon for him who has a long way to come.

Besides all the hardy cereals and vegetables, which are produced in great abundance in the inhabited valleys, we find some farms in the Bitter Root and other sunny basins where apples, plums, grapes, cherries, pears, nearly all small fruits, melons, tomatoes, and even tobacco and pecans, are among productions which indicate a not very forbidding clime. Irrigation is considered necessary in most localities, although some large crops were raised this year without it. This is an expense of about fifty cents per annum per acre.

STOCK-RAISING.

As a stock-raising section Montana is rapidly becoming known to the outside world. Its beef-cattle are the best sent to the Eastern markets from the grazing-regions, and bring the best prices. It is acknowledged the best grazing-land in the world. Cattle live and increase without a shelter other than the broad canopy of the heavens, or food provided except as it grows and is left for them spread over the great hills and plains they make their homes. Sheep and horses roam through the severest winter, exposed to the climate, compelled to live entirely by grazing. Nothing is expended for them save the services of a herder, who keeps a general survey of the range. Matured steers sell readily at the ranch at an average of twenty-five dollars per head. Marketing them consists of driving, during the summer, south through Wyoming to the Union Pacific; thence to Chicago by rail. Sheep are worth from two and a half to three dollars per head. The estimates on sheep-raising are that the expense is equal to the wool-product, leaving the increase of flock as profit! Wool is standard at twenty cents per pound. There are no fatal diseases in the Territory to which sheep are subject; the only affliction among them is scab, a curable affection. Can we demonstrate anything plainer to the reader than that a few thousand dollars invested by him who will endure an outdoor life, and a lone one, in stock-raising here, must inevitably make him independent in a few short years? Last winter was the severest within the past fifteen years, and yet the loss of stock was little, if any, above the average loss—from two to three per cent.

VAST PASTURES, DETAILS OF THE BUSINESS, ETC.

There are 38,000,000 acres of grazing-lands, and of these not 10,000,000 have yet been occupied. Heifers produce at two years of age, and the winters are so mild that not one calf in ninety dies. It is unnecessary to put up any hay for stock in winter. It can run out every month in the year. The increase of sheep is one hundred lambs to every hundred ewes, and ninety per cent. of the lambs live. The produce of wool is immense, and four to eight pounds of fleece are cut. About 350,000 head of cattle are now owned in Montana, 250,000 head of sheep, 40,000 head of horses, 3000 head of mules, and 10,000 head of hogs. Poultry is very scarce, and turkeys sell for three dollars apiece, chickens from fifty cents to one dollar each. During 1879 over 50,000 head of cattle were driven out of the Territory for beef, and 1,000,000 to 1,500,000 pounds of wool shipped. Sheep yield from thirty to forty per cent. profit, and horses from twenty to thirty per cent. The loss in sheep is one to one and a half per cent., and horses two per cent. per annum. Yearling steers in Montana bring seven to ten dollars; two-year olds, twelve to twenty dollars; three-year olds, twenty to twenty-five dollars, and four-year olds, twenty-five to thirty-five dollars. Cows are worth ten to forty dollars, according to their quality. Common sheep are worth two to three dollars, and graded four to five dollars.

DAIRYING, POULTRY, ETC.

Climate, pasturage, water, and an unequalled market for dairy products combine to render dairying one of the most lucrative pursuits. Cows cost not a dollar for their keeping from one year's end to another, and the product of butter and cheese is by some figured a clear gain, as the increase in stock pays all expenses. The dairymen are numerous in Montana who commenced five or six years ago with rented cows, and no capital but willing hands. To our personal knowledge, a large portion of them are possessed of good ranches, and worth from five to ten thousand dollars each, all made by good, honest labor in the corral and milk-house. Over one million pounds of butter and cheese were produced in the Territory in 1878, and the average prices obtained were forty cents per pound for butter and seventeen cents per pound for cheese. The demands for products of the dairy were never harder to meet than during the past winter, and those who embark in this industry now can duplicate the experience of the pioneers with almost absolute certainty. It is almost impossible to secure eggs or poultry at any price, while no climate could be better for the production of the feathered tribe than this.

The average farmer here soon works into the ownership of a nice herd of stock, gets independent of ordinary farm-drudgery, as he calls it, and leaves hundreds of openings for the diversified industry of the Mississippi or Missouri Valley. It is these small items of the dairy, the hennery, and the truck-patch which hold out the highest inducements to industry, and are yet the most available for poor home-seekers. Many dairymen are going out of the business, simply because their rapidly-increasing herds will support them handsomely without work.

PRICES OF PRODUCTS.

The following are the prices paid last winter to ranchmen in Montana cities for the offerings of the farm and dairy: Wheat, 2 cents per pound; oats, 2½ cents; hay, $10 to $12 per ton; potatoes, 1½ cents per pound; onions, 5 cents; squashes, 4 cents; cabbages, 6 cents; butter, 45 cents; eggs, 75 to 90 cents per dozen; turkeys, $3 to $5 each; chickens, $6 to $7 per dozen.

GETTING HOMES.

It should be borne in mind that the above prices were obtained for productions of lands which have cost practically nothing but their improvements; homestead laws apply here as elsewhere. In few of the valleys are one-fourth of the desirable lands taken; in fact, only 400,000 acres of the vast agricultural area outlined above are accounted for on the tax-lists. Montana is clearly an empire of itself that offers homes and support for millions of the landless toilers of the crowded East.

Nearly all Montana pioneers first built good, comfortable log houses at almost no expense but their own labor. This also applies to fencing and other improvements. Forests being adjacent to nearly all the valleys, the situation remains unchanged to-day, and the man with muscle, and will to exert it, can build for himself a home—better than his forefathers enjoyed in New England—at less expense than in any Eastern or prairie State we know of. Improved farms are very cheap in all the valleys, when their wonderful productiveness and unequalled market are taken in consideration. They can be purchased well fenced, with fair buildings and the necessary ditches and water-rights, for from fifteen to twenty-five dollars per acre.

MINING.

Mining gold and silver is now, as it ever has been, the chief industry of Montana, though it differs vastly in all particulars from the days when Virginia City and Alder Gulch were notorious. Placer-mining, with the quarrelling, killing, and hanging attending the excitement of rich pans, big pockets, and marvellous finds, has almost entirely given way to quartz-mining, with its attending life, sober, lawful industry, with only the confusion and uproar of the stamp-mill and smelting-furnaces. Mining has indeed been revolutionized, and while the yield of gold has much lessened, it has resolved itself into a legitimate, steady business, through which the Territory is vastly the gainer. With it all there is, within the last year, a reaction in favor of an increased yield, which promises much. In 1877 the amount of gold and silver produced was $3,500,000, compared to $6,700,000 for 1878, and about $8,000,000 this year. Some of the best quartz-mines of the Territory reach the following amounts: The Lexington, near Butte City, last year produced $240,000; the Alice Mine, same place, yielded during the summer $45,000 per month; the Phillipsburg Mine yielded $300,000 last year; the Penobscot, twenty miles from Helena, yielded $500,000 during the year; the Whitlach Union has had a total yield of $3,500,000.

The total yield of the precious metals in Montana during the past sixteen years has been $153,000,000—more than that of Colorado, Utah, and Idaho combined. About $147,000,000 of this is gold, placing Montana only second to California in the production of that metal. The fifty-thousand-dollar gold brick of the Penobscot Mine, near Helena, a product of thirty days during the past season, startled readers all over the Union.

Ores containing from twenty to sixty per cent. copper, unlimited in quantity, are found in several districts. There have been on exhibition at Helena ores from forty-eight different iron-mines or deposits, running in value from twenty-five to eighty per cent. iron, and representing every conceivable variety of ore. An iron-mountain in Deer Lodge county, larger than the famous deposit of Missouri, averages thirty per cent of that metal. Coal-beds lie within three miles, and an iron-furnace will be built this season. Professor Hayden and others estimate that from fifty to sixty-five thousand square miles of Montana's area are underlaid with coal. Several measures are yielding an excellent quality of fuel. Lead ores, averaging seventy-five per cent. of lead and a proportion of silver, are also frequent.

BUSINESS, WAGES, EXPENSES.

The Territory affords fine opportunities for business-men of either large or moderate means who will be content with profits ranging from fifteen to twenty-five per cent. on capital invested. Money is rarely loaned on any kind of collateral at less than two per cent. per month interest, and from that to three and four per cent. Stock-men claim that they can well afford to borrow money at two per cent. per month, and bankers are of the opinion that the borrower in such cases makes as much as the lender. There has been only one business failure of any magnitude in Montana for years. Business is done generally on a cash basis, and Montana merchants rank among the highest in the country, according to commercial agencies.

Montana has never, like some other Western sections, been flooded with labor. The cause is very apparent—from its distance from the railway, and the consequent expense and trouble incurred in getting there. The industrious machinist, carpenter, cook, or bricklayer gets higher wages there than the confidential bookkeeper of a representative Eastern business-house, and the farm-hand, laborer, or even herder, who scorns to work more than ten hours a day, commands more pay than the skilled workman in New York. Mechanics of all kinds command from $4.50 to $7.50 per day. Unskilled labor receives never less than $3 a day. Prices of all necessaries (save meats and flour, which are often cheaper than in the East) are about twenty-five per cent. higher than in the Middle States. Board and lodging at first-class hotels cost from $12 to $16 per week; at quite comfortable places of less pretension, from $7 to $10.

Although 12,000,000 acres of Montana's area are covered with heavy pine forests, the high price of labor makes building material rather expensive. Rough lumber sells at from $20 to $30 per 1000 feet; dressed finished lumber, matched flooring, etc., at from $40 to $50. Good two-horse teams can be bought in any of the agricultural districts at from $150 to $225; oxen, from $80 to $100 a yoke. Farming implements, wagons, etc. will average twenty-five per cent. higher than at points east of the Missouri.

ABOUT THE TOWNS.

Helena, the capital of Montana, is located in the central part of the Territory, and has a population of 5000 inhabitants. It has many fine public and private buildings, and employs a cash capital of $5,000,000. Virginia is in the southern part of the Territory, and has a population of

1500. It is near the famous Alder Gulch, which still produces annually $500,000 in gold. Butte is a beautiful town, and already second to Helena. It has a population of 3000 souls. Bozeman is at the head of the famous Gallatin Valley, and is surrounded by the richest farming-region in the West. It has a population of 1000, and is rapidly increasing. Deer Lodge, Missoula, Bannack, Benton, Radersburg, Vestel, and Phillipsburg are also fine and growing towns. The Yellowstone Valley is in Montana, and has two towns—Miles City and Sherman. The population of the Territory is about 40,000; assessed valuation, $14,000,000. Yellowstone Valley is capable of sustaining twenty-five thousand farmers, and the settlements have just been founded. We have ridden up and down the valley several times, and its upper portion has few superiors in the United States.

Montana has indeed a wonderful future before it, and we know of no place where the farmer, manufacturer, or professional man can enter with a greater assurance of prosperity. Telegraph-lines have already been established to many parts of the Territory, and there are four daily and ten weekly papers, giving all the news. The isolation of the Territory has heretofore prevented many persons from seeking it, but now that this rich and unknown land is connected with the outside world by railroads, it will soon be filled up and become a prosperous commonwealth.

RAILROADS.

Montana has always been far off—in miles, in time, in facilities for getting there—and it is not hard to comprehend that, rich as it is in resources, it is almost an outside world. At present, home-seekers can reach its boundary by rail. There is only one route available from all points and the year round—by the Union Pacific Railroad to Ogden, Utah, and north over the Utah and Northern Railway, 275 miles, to Beaver Cañon, its present terminus; thence to various points by daily stage. One can thus go to within a thirty-six-hour stage-ride of most Montana towns, and the Utah and Northern will undoubtedly be extended farther northward in the spring. The time from Omaha to Helena at present is less than five days, and the fare very reasonable, considering the distance.

MONTANA POINTS

are reached by Gilmer, Salisbury & Co.'s daily stages in from twenty-three to forty hours from Beaver Cañon. The rates of fare now in force from Omaha to the most important places in Montana are given below, with the distances and stage-time from Beaver Cañon, present terminus of the Utah and Northern Railway:

	First Class.	Second Class.	Emigrant.	Distance, miles.	Stage-time, hours.
Lovell's	$100	$75	$45	118	23
Virginia City	100	75	45	193	28
Butte	100	75	45	208	32
Deer Lodge	100	75	45	235	38
Helena	100	75	45	245	40

Holders of second-class and emigrant tickets, *viâ* Gilmer, Salisbury & Co.'s line, will be carried from the railway terminus to destination in covered mail-wagons—one hundred pounds of baggage free by rail; forty pounds free by stage, on first-class; fifty pounds free by wagon, on second-class and emigrant; extra baggage on stage- and wagon-lines, fifteen cents per pound. Stages and wagons run daily.

The travel to Montana is increasing wonderfully, and the through rail-route *viâ* Omaha, Ogden, and the Utah Northern Railway, carries it, as it deserves to. In addition to the already splendid equipment of the stage-line between the Utah and Northern terminus and Montana cities, coaches that will carry thirty passengers have been ordered by Gilmer & Salisbury to run between those points, and will be put on the route this winter.

B. F. POTTS, GOVERNOR OF MONTANA, SAYS:

"The farmer, the miner, the merchant, the tradesman, and in short all classes of our people, are prosperous and contented. Capital yields satisfactory returns, and labor is liberally rewarded.

"The Utah Northern Railroad, a branch of the Union Pacific Railroad, has been built into the Territory during the present year. The completion of this road will enable the landless citizens of the Eastern States to reach Montana, where homes can be obtained more advantageously than in almost any section of the country."

MINERAL RESOURCES.

BY Z. L. WHITE.

THE chief resources of Montana's mineral wealth have heretofore been her rich placers, which are estimated to have yielded about one hundred and forty million dollars' worth of gold-dust. The placer-ground in most of the gulches was originally worked over with pick and shovel at a time when wages were high and no one could afford to wash the gravel with very great care. Now much of this old ground has fallen into the hands of men who are able to spend large sums in new water-ditches and bed-rock flumes, enabling them by means of Chinese labor to work over by the hydraulic process and ground-sluicing not only the old tailings, but also the "lean" ground that was left before. Besides this, some of the old gulches have never been worked out, and new ones are discovered almost every year. During the past summer there has been a stampede to the Judith Basin, where there are unquestionably good placers. The eastern portion of the Territory, which has only recently been opened, has never been thoroughly prospected, and new diggings will undoubtedly be discovered in many parts of it. I am therefore of opinion that although the product of the placers of Montana will not in the future be as great as it was in the first few seasons after the discovery of gold here, it will continue to be several millions a year for a long time to come.

The gold quartz-mines of this Territory which have been developed are not very numerous, and have been operated with varying degrees of success. The Whitlach Union Mine, near Helena, after yielding three or four millions, has suspended. There is a division of opinion as to the cause of its present condition, some holding that it is due to bad mining and the failure to open new ground while the old was being stripped, and others declaring that the vein has been worked out. The Atlantic Cable, in Deer Lodge county, has been, and perhaps still is, a very promising mine, but has been involved in litigation for ten years, which has not only sucked the life-blood out of it, but prevented the investment of capital in its proper development. The mines in the Silver Creek district (the Lexington, Belmont, Hickey, and others) are excellent properties, now producing about fifty thousand dollars a month, with a probability of an increase. The Lexington, the largest and best known in the district, will probably begin to pay dividends at the opening of the new year, but whether it will be able to pay high rates of interest on the enormous price at which the mine was bought and the cost of the expensive improvements that have been necessary, remains to be proved. I have no doubt that its monthly product will be a large and increasing one. I think there are some excellent openings for the investment of capital in gold quartz-mines in Montana, but in order to ensure success it ought to be associated with the best and most experienced mining skill. New leads are constantly being discovered, and some of them will undoubtedly be developed into good mines.

The two successful silver camps in this Territory to-day are Butte and Glendale. The former, I believe, will offer unrivalled inducements to capital and enterprise, and I look to see it become one of the "booming" camps of the West. At Phillipsburg and Wickes preparations are being made for the mining and milling of large quantities of ore, and the former of these camps is now sending some silver bars to market. There are hundreds of silver-mines in Montana that are only waiting for the advent of capital and cheap transportation to be converted into first-class properties.

It is unnecessary to warn Eastern people against wild-cat schemes. No man or company can afford to expend capital in the purchase and development of a mine and in the erection of reduction-works until the property has been examined and reported favorably upon by a competent, disinterested expert. A disregard of this fundamental rule has been the cause of more than one disastrous failure in Montana. A wild-cat scheme cannot be foisted upon capitalists if proper precautions are taken; if they are neglected, mining operations become lotteries in which one may draw a prize, but is very much more likely to get a blank.

The reduction of silver ores is a process requiring a knowledge of chemistry and metallurgy, and practical experience in the application of scientific principles to the treatment of different kinds of rock. The failure of the Montana Company at Jefferson a year ago was confessedly due to a neglect to observe this axiomatic rule. Other silver-mining enterprises in this Territory have failed for the same reason. The losses incurred in these cases will probably serve as a warning to those who inaugurate new enterprises in the future.

Mining as a legitimate business has been brought into discredit in Montana, as in other Territories, by the dishonest management of some officers and superintendents. Mining is no longer a legitimate enterprise, but an outrageous swindle, when it is managed for the purpose of raising or depressing the value of the stock in the interest of a clique of speculators; and yet too many concerns are operated in this way. If it is desired to bull the stock, it is very easy for a superintendent to strip his mine of the ore that has been made accessible by previous development-work, thus greatly increasing the product for a few months without increasing the working expenses. In the same way a cotton-manufacturer in New England might divide among his stockholders all the money he received for his fabrics, without retaining any with which to purchase fresh material or to keep his machinery in order. A time would soon come when he would either have to make an assessment upon his stockholders, borrow money, or stop, but in the mean time, if his method was kept secret, the price of his stock might be enormously advanced.

On the other hand, a superintendent may keep his entire force at work for months in sinking new shafts and driving new levels without producing ore, until a number of dividends have been passed and the stock is greatly depreciated, although the mine may be growing better and better all the time. It is as though the manager of the cotton-mill should go on month after month spending his entire receipts for new material, secretly piling it up in his storehouse, and reporting no profits. I could name good mines in Montana that have been ruined by this sort of management. For a few months they have paid large dividends, and the stockholders have supposed they owned a bonanza. But all at once production has stopped, there has been no ore in sight, and the mine must close unless money to pay current expenses is obtained either by an assessment or by a loan. Honest people will do well to give a wide berth to any company whose stock is suspected of being the football of speculators. The richest bonanza in the country cannot make such an enterprise a safe one to invest in.

The revival of popular interest in gold- and silver-mining has caused the owners of undeveloped properties, and even investors in the East, to have an exaggerated estimate of the value of mines and prospect-holes. It is an axiom among conservative miners that no mine is worth more than the actual value of the ore in sight. Even then the purchaser takes the risk of finding enough new ore to pay for the expense of taking it out and the interest on his money invested. This is a pretty safe rule to be governed by in making purchases. Thoroughly-developed mines on strong, well-defined veins are undoubtedly in many instances worth much more than the value of the ore in sight, but in a new mine the man who buys ore *in posse* gambles on an uncertainty.

I do not wish, by anything I have said, to disparage the mines of Montana or throw discredit upon their management. I believe the mineral resources of this Territory to be wonderful in their extent and richness, and that the failures in mining enterprises have generally been due to lack of capital and experience and the isolation heretofore of Montana from the remainder of the country, rather than to dishonesty. At the same time, I have written what I believe every man in the East who thinks of investing in mines ought to know, and what he is not likely to learn except by spending a season among mines and miners, as I have done.

STOCK-RAISING IN MONTANA.

MONTANA is the best grazing-country in the world. I know that this is a bold assertion to make, but after seeing something during the past summer of the best cattle-ranges of Kansas, Nebraska, Colorado, Dakota, Wyoming, and Utah, which States and Territories furnish so large a proportion of the beef consumed in this country, and talking with stock-men, army officers, and others whose acquaintance with the West is far more extensive than my own, and whose experience gives to their opinion great weight, I am certain that it is not an exaggeration. There may be portions of South America where cattle, sheep, and horses can be raised at less expense than in Montana, but there certainly is no part of the United States where the same grade of animals, ready for market, cost the ranchmen less money, while the price which they command is many times greater than in any of the Spanish-American republics, and but very little below that obtained in the less remote States and Territories this side of the Missouri River.

No one can spend a week in any part of Montana without hearing some of the most marvellous reports about the profits that have been realized during the last few years in the business of stock-raising in this Territory. These stories, many of which have reached the East recently in enthusiastic newspaper letters and pamphlets published in the interest of Western railroad companies, are true, so far as I have been able to verify them; but while, as a rule, they relate only to the exceptionally successful ventures—just as the wonderful yield of a bonanza-mine in a camp is heralded from one end of the country to the other, while the hundred prospect-holes which have been failures are never heard of—the unvarnished truth about the average profits of the business will seem almost incredible to Eastern people. It is only now and then that a herd of cattle, sheep, or horses yields a net income of from forty to sixty, or even one hundred, per cent. per annum; but I doubt if there is a single instance in which, taking a series of years together, the profits on stock-raising have not been from twenty to thirty per cent. on the original investment; and that, too, in cases where the animals have suffered severely from unusual cold and snow in the winter or from disease.

In the first place, the grass is better and more abundant than in any other of the Western States and Territories. In previous pages I have mentioned the fact that the bunch-grass grows not only all over the valleys and the benches, but on the foot-hills, and even on many of the mountains themselves. The supply of it is inexhaustible. Even in the older settled portions of the Territory, where improved farms are frequent, often adjoining each other in the valleys, the cattle, sheep, and horses do not begin to eat down the grass, and although the ranges for several miles on each side of the valleys may be nominally taken up, they are still capable of sustaining many times as many animals as now graze upon them. No one who intends to raise stock on a large scale or to make that his chief business would think of driving his animals to these particular hills near the settlements, but the farmers whose flocks and herds are now feeding upon them, and who want their cattle near at home, may increase the size of their herds almost indefinitely before there will be any scarcity of feed.

But it is not in those portions of the Territory that have been longest settled that stock-raising is most profitable. The valley of the Yellowstone River from near the National Park to its mouth is six hundred and fifty miles long, and on an average from ten to twelve miles wide. All of this land can be easily irrigated and placed under cultivation. Hundreds of families have settled there this year. On either side for almost the entire length of this valley are benches, foot-hills, and prairies covered with bunch-grass and amply watered by small streams. Nor is this all. There flow into the Yellowstone from the south the Powder River, the Tongue River, Big Horn River, Clarke's Fork, and almost innumerable smaller streams, the valley of each of which is from thirty to one hundred miles in length, and nearly every one affords as good pasturage as is to be found in the world. Nearly the whole of this country has been inaccessible until within the last eighteen months or two years, and the tide of immigration has only just begun to flow in. A few herds of cattle have been driven into the valleys of all the streams I have named, but it is safe to say that there is not one steer there to-day where there is feed for a thousand.

Even the extensive ranges that are more accessible are far from being occupied. Thousands of cattle have been driven this summer to the Sun River country and to the sparsely-settled sections north and north-east of Helena, and even there the ranges are so large that in riding over them one would have difficulty, except for the trails, to select the lands upon which the cattle have been feeding from those which have not been touched. I should not dare to make an estimate of the number of animals that Montana can sustain, but I am perfectly safe in saying that hundreds can graze in her valleys and on her hills where now there is one, and that it will be many years before it will be possible for the stock to begin to be crowded.

I said that the grass in this Territory is better than it is elsewhere. It is bunch-grass, that grows from one to two or three feet high. In most places the bunches stand close together, and cure early in the summer. In August and after, until the next spring, the grass has a color somewhat similar to that of ripe wheat, although the yellow is not quite as bright, and the country looks like one vast field of grain nearly ready for the harvest. This grass is wonderfully sweet and nutritious. Cattle fatten upon it quicker and keep in better condition than those which feed on the blue-grass of Kentucky and South-western Virginia or the buffalo-grass of Nebraska and Colorado. The beef is remarkably sweet, tender, and juicy, as I can testify from having eaten of it every day for more than a month. The proprietor of the two most popular hotels in Salt Lake City also told me that Montana beef, of which he had occasionally obtained some, was far superior to any other he could get, and equal in quality to the best stall-fed beef in the East. The chief fault I have heard found with it both here and in Salt Lake has been that in summer it is too fat. In winter even cattle that are on sheltered ranges keep in excellent condition.

Very few of the stock-men of Montana make any provisions for feeding their cattle in the winter, and there is no herding in the summer, as in Nebraska, Colorado, and Wyoming. Old cattle-owners say that a herd that is fed occasionally when a heavy storm comes will not winter as well as one that is not fed. The cattle which receive hay once are likely to remain in the immediate vicinity of the ranch, even after the feed there has become short, and if driven away will return. As it is impossible to feed them all the time, they grow lean, while if they stay out on the range, where the grazing is better, they will keep in good condition. The grass is stiff, and on the hillsides is rarely entirely covered with snow. The loss from exposure is said to be not more than one or two per cent. Whether there is force in this reasoning or not, it is certain that some of the most careful and most successful stock-men are beginning to put up hay as a precaution against severe cold and deep snows. They say that the cost of the hay, which is cut with machines in the natural meadows along the river-bottoms, is only from fifty cents to one dollar a ton, and that in the long run, by being prepared to feed their cattle a little in the winter if it is necessary, they save more than enough animals that would otherwise perish to pay for their trouble and expense.

The customary way of managing a herd of cattle in Montana is simply to brand them and turn them out upon the range. Some stock-owners give no more attention to their cattle until the next spring, when they round them up, brand the calves, select those they intend to sell, and turn the remainder out again. Under this careless management they are sure to lose some steers, which stray away or are stolen. The more careful managers employ one man for every fifteen hundred or two thousand head of cattle, whose duty it is to ride about the outskirts of the range, follow any trails leading away and drive the cattle back, and to go among neighboring herds, if there are any, looking for stray animals and driving them home. At the spring round-up a few extra men have to be employed for several weeks.

In starting a new herd, cows, bulls, and yearlings are bought. The older cattle of ordinary grade (they are all American—no long-horned Texans) cost from fifteen to twenty-five dollars a head, the calves under one year old running with the herd not being counted. Yearlings may be obtained for from five to seven dollars each. The average cost of raising a steer, not counting interest on capital invested, is from sixty cents to one dollar a year, so that a four-year-old steer raised from a calf and ready for market costs about four dollars. He is worth, on the ranch, about twenty dollars, and if driven to Fort Benton or to the railroad in Wyoming, at least twenty-five dollars. A herd consisting of yearlings, cows, and bulls will have no steers ready for the market in less than two or three years. Taking into account the loss of interest on capital invested before returns are received, all expenses, and ordinary losses, the average profit of raising cattle in Montana during the last few years has been at least thirty per cent. per annum. Some well-informed cattle-men estimate it at forty to forty-five per cent.

A large and increasing percentage of the cattle and sheep of Montana are owned by persons who do not manage them themselves, and some of whom do not reside in this Territory. Nearly all the leading merchants and bankers of Helena own interests in herds of stock, and lawyers, doctors, and Federal officers are following their example, and investing either their own money or that of their friends in the East in cattle, sheep, or horses. A man who desires to invest in stock, and who has not the time or inclination to attend to the business himself, takes as an associate some man of experience and integrity, but destitute of capital (of whom there are many in Montana), and gives him entire charge of the herd. This man selects the range, cuts the hay that is necessary, moves the animals when necessary, attends to the rounding-up, and drives those that are sold to the place of delivery, paying all expenses and being entirely responsible for the management of the business. For this he receives one-half of the increase of the herd, the man who furnishes the capital taking the other half. The returns which capitalists obtain on their money invested in this plan in a herd of cattle are never less than fifteen per cent., in a flock of sheep twenty per cent. and upward, and in a band of horses much greater than in either.

A new plan for dividing the profits in this business between capitalists and managers has lately been suggested, and will probably be tried next year. The manager is to take the herd purchased with the money furnished by his partners—the latter retaining the title to the animals—find a suitable range, and pay all the expenses of the enterprise, until from the profits he has paid back to the investor a sum of money equal to that which he at first put in. Then the manager is to become the owner of one-third of the business and to receive thereafter one-third of the profits, the expenses being paid out of the receipts. It is proposed by responsible men in Montana to organize stock companies in the East for the purpose of conducting the cattle- and sheep-raising business on this plan, and, with ordinary precautions in the selection of a proper man to manage such an enterprise I can imagine no undertaking in which the security can be better or the certainty of large profits greater.

The management of sheep is of course different from that of cattle. A flock of sheep containing one thousand and upward, in good condition and free from disease, may be bought here this season for three to three dollars and a quarter a head. They must be herded summer and winter in separate flocks of not more than two or three thousand each, corralled every night, and guarded against the depredations of dogs and wild animals. Some hay must be provided with which to feed them when there are deep snows, and sheds ought to be erected to protect them from the most severe storms. Cattle and sheep cannot live together on the same range. The latter not only eat down the grass so closely that nothing is left for the cattle, but they also leave an odor which is very offensive to steers. Although the cost of managing sheep is greater than that of handling cattle, the returns are quicker and larger. While a herd of young cattle begins to yield an income only at the expiration of three years, sheep yield a crop of wool the first summer after they are driven upon a range, and the increase of the flock is much greater than that of cattle, being from seventy-five to one hundred per cent. a year. The wool is of good quality, free from burrs, not washed, and brings a good price on the ranch, the competition between buyers sent out here from Eastern cities to obtain it being very great. Many thousand sheep have been driven into this Territory this year from California, Oregon, and Washington Territory, and every flock that has arrived has been gobbled up by men eager to increase their flocks or to start new ones.

It is not my purpose to mislead any reader by reciting the cases in which unusual profits have been realized in the business of stock-raising, but it may be interesting to know what has occasionally been done in cases where all the conditions have been favorable, just as we like to hear of the rich returns which bonanza-mines sometimes give. The following is an example: Judge Davenport of this Territory four years ago last July purchased one thousand ewes, which cost him in the neighborhood of three thousand dollars. These he put in charge of a young man, who was to take them on a range, care for them, pay all the expenses of the flock, and to receive as his share one-half the wool produced and one-half the increase of the flock. At the end of four years a settlement was to be made, and Judge Davenport was then to receive back one thousand of the best ewes which the flock contained. The settlement was made last July. In the mean time, Judge Davenport had received for his share of the proceeds of the wool $6500, and for his share of the increase $8000. The profits of his investment of $3000 for four years were, therefore, $14,500, or $3626 (or 121⅞ per cent.) a year! During the same year other men made only fifty or sixty per cent. on their sheep, and some, who from inexperience or bad fortune met with heavy losses, perhaps not more than twenty-five per cent.; but I have never heard of a single instance in which there has been an absolute loss in a period of, say, three or four years. One man, driving a large flock of sheep from the South a year or two ago, was caught by the winter in an unfavorable place and lost one-half or two-thirds of his flock, but at the end of three years, when he came to balance his books, he found that the remnant of his flock had done so well that his profits had been about twenty-five per cent. a year on his original investment.

The number of cattle now in the Territory is estimated at 500,000, and the number of sheep 250,000. The wool-clip this year was about 900,000 or 1,000,000 pounds, which sold, on an average, for twenty cents a pound. I have seen no estimate of the number of horses in Montana, but I think there are only a few very large bands. Horses will endure the cold weather and get at the grass if it is covered by snow much better than cattle, but they are so much more valuable that most owners prefer to have their bands fenced in or herded pretty carefully. The best horse-farms are in valleys ten or twelve miles long, on the sides of which the foot-hills extend up to high mountains. By building a fence across each end of such a valley the horses are prevented from straying from the range. The profits upon the rearing of horses and mules are very great, and there is a ready market for all that are offered.

What I have written in this paper will undoubtedly prompt some one to ask, "Can any one from the East, with a capital of a few thousand dollars, go to Montana and engage successfully in the business of stock-raising?" No, unless he supplements his capital with experience, either of his own or of some one with whom he associates himself. A man reared in an Eastern city or town to professional, mercantile, or manufacturing pursuits would be as helpless with a herd of several thousand head of stock on his hands as a Western ranchman would be in a cotton-mill. But with an experienced partner even a city man would soon learn the business.

The first thing to be done in entering the stock business is to select a good range, and to do this requires a pretty thorough knowledge of the country and of what constitutes a desirable location. Foot-hills from which the snow will be likely to blow off, exposing the bunch-grass, good water, cañons in which the animals may seek shelter from storms, and natural meadows if hay is to be cut, are all considered essential. The greater the distance from other ranges, the less trouble there will be from the mixture of the animals of other herds and the less the expense of rounding-up. Of course the ranges are all government land, to which no title can be obtained, but the right of the first occupant to the land he uses is universally recognized.

Cattle and sheep are subject to diseases which the herder must know how to treat. Young cattle, yearlings, and two-year-old steers have suffered severely in some parts of Montana this year from the "black leg," a congestive disease, which has destroyed from one to two or three per cent. of the flocks on some ranges, and greatly alarmed the owners. The cause of this distemper is not known, but it has proved fatal in every case. The disease known as scab has been brought into Montana by sheep from California, Oregon, and Washington Territory, and it has been spread among many of the flocks that before were healthy. This disease can be cured by proper treatment, but the losses from it have been considerable.

In conclusion, I can only repeat what I have already said—that Montana is the best grazing-country in the United States; that stock-raising here, when intelligently conducted, is a safer business and more profitable than any other I know of; and that more people are going into the business and investing more capital in it than are turning their attention to any other of the industries of the Territory.

HINTS TO MEN WITHOUT CAPITAL.

THERE are room enough and work enough in Montana for all the people who may desire to make it their home for years to come, and who are willing at the same time to forego for a season a few of the luxuries which make life in the older States so attractive, and to adapt themselves meanwhile to the conditions which they will find existing here. I have written very briefly about the grazing and agricultural resources of the Territory. They are simply wonderful, and in their development offer to thousands of people from the East the opportunities for gaining a competency, if not a fortune. The remoteness of Montana, not only from the Eastern States, but from the lines of railroad which connect the other far Western States and Territories with them, has thus far been a barrier against a large immigration into its beautiful valleys. Men will go to the ends of the earth in search of the precious metals; they will deny themselves all the comforts of life, defy savages and wild beasts, and face dangers before which almost any other class of people would turn back. But the farmer who intends to make his home on the land which he reclaims and cultivates (the prospector or miner is only a bird of passage, who always calls his home "a camp" even after it has become a solid, permanent town) must have a certain degree of security for himself and family and a market for his surplus products.

The farmers of Montana have, as a rule, been hardy fellows, fond of adventure, who have established themselves near the military posts and successful mining camps or along the great lines of travel, and very many of them have lived as the miners and prospectors do, without families or the comforts and refinements which the presence of women only can give. All this is now changing. People are hearing about the wonderful natural resources of the Territory, and are seeking new homes here, intending to make Montana their permanent residence. Any one who has capital needs no suggestion in regard to settlement in these valleys of the Rocky Mountains. He has the means of learning where the best lands are, and how to obtain them, and he can make a personal inspection of the country, and, if he desires, purchase an improved farm. With a poor man it is different, and it is for the benefit of this class that I desire to give a few hints.

The cost of reaching Helena from any of the Atlantic States is a little more than one hundred dollars. To make the journey for this sum one must travel in emigrant-trains to the terminus of the railroad, and thence to Helena by the "fast freight" line; that is, in ordinary farm-wagons with spring seats and canvas covers. The journey from New York will occupy between two and three weeks. In addition to the fare, the traveller has, of course, to supply his own provisions, and unless he sleeps out of doors in his blankets his bed will cost him fifty cents a night on the wagon-journey. The expense of reaching Montana by first-class trains and in the stage-coaches will of course be considerably greater.

A man who comes to this Territory early in the spring will have no trouble in securing employment on a ranche at the rate of from thirty to forty dollars a month and board. One season's work on a Montana farm gives a stranger an opportunity to become acquainted with the methods of cultivation prevalent here, and to look about for a place on which to settle. I have seen several men who have come here from the East, leaving their families at their old homes; they found immediate employment, have taken up during the first season a quarter section of land, and put up a house for the shelter of their wives and children on their arrival. I met on the stage-road one day a family consisting of a mother, a daughter about fourteen years of age, and three smaller children, who were making the journey alone from one of the counties of Central New York to the Jefferson Valley in this Territory. The lady told me that her husband and son had come to Montana last year, and had found employment on neighboring ranches. In the spring they sent for the eldest daughter, who had, since her arrival, been engaged in teaching school, and last month the remainder of the family when I met them were on their way to their new home.

When a man has become sufficiently established on his new ranche to have raised one crop of wheat or oats and to have got a few head of stock, he need have no fear for the future. Patient industry brings swift and great rewards. In going to Phillipsburg a week or two ago I rode twenty-five miles with a Scotchman who has a farm in Deer Lodge county, near New Chicago. He told me that he had taken up one hundred and sixty acres of land about four years ago. At the time he had no capital, but was master of a good trade—that of a carpenter—and had two sons old enough to assist in the farm-work. The old gentleman had worked several months each year at his trade, earning five dollars a day, "And," he said, "I hardly know how it came about, but we have to-day a finely-improved farm, a good house, about fifty head of cattle, and seven good horses, five of them good Americans three years old. I have spent very little money for stock, and all that we have is the result of only four years' work. We sell enough butter, chickens, and eggs to pay our grocery-bills, and are now saving some money, besides what goes to improve our place. I have been twenty years in the Western States, and I have never seen a place where a poor man can get a start as easily as here."

A stranger who desires to work into the stock-raising business will find in Montana opportunities to do so, even though he may not have capital to invest in sheep or cattle. One who has been accustomed to the care of stock in other sections of the country will, of course, get better wages on the ranges than one who is totally unacquainted with the business; but so many new herds of cattle and sheep will be driven out upon new ranges next spring that any one who is willing to work and anxious to learn will have no difficulty in obtaining employment. In Colorado and Nebraska a man working by the month with a "cord outfit," as a herd is called there, has the privilege of having a few cattle of his own on his employer's range, and the same arrangement could undoubtedly be made here. The profits of stock-raising have been so great in Montana that almost all business-men here, as well as many who have never seen the Territory, are anxious to invest some money in it, while many of them do not desire to manage the flocks or herds themselves. There are, therefore, numerous opportunities for responsible men, known to be experienced in the care of sheep and cattle and honest in their dealings, to become partners in the stock-raising business with the investment of little or no capital. If one man furnishes all the money and another takes the entire care and management of a stock of sheep or cattle, it is customary to divide the annual increase and the wool that is cut from the sheep equally between the two. Some of the most successful stock-men in Montana have got their start by taking flocks and herds to manage on such terms as I have described.

Of course, farming and stock-raising in Montana are subject to the same vicissitudes which sometimes cause failure elsewhere. A farm that is properly irrigated will never suffer from drouth, but the grasshoppers may sometimes injure or destroy the crops, and other noxious insects may appear, as they do in the older States. So, also, disease may appear among animals, or some of them may perish during an unusually severe winter; but these are risks which have to be taken everywhere, and are no greater here than in any other new country.

Skilled mechanics are in great demand in Montana. Carpenters earn five dollars a day, and many more could have found employment in Helena and about the principal mining camps during the past summer if they had been here. I have known of several instances in which important building operations were delayed because carpenters could not be obtained. In Helena and Butte bricklayers and stonemasons have no trouble in finding employment, but in most of the other towns the buildings are all of wood. Good blacksmiths find plenty of work, not only in the towns, but at the mines, every one of which is obliged to employ several when in operation. Almost all of the machinery in Montana is built in the East, so that there is as yet little work here for moulders and machinists. A few engineers are needed at every large mine, and one or two machinists are employed to make small repairs on pumps, hoisting-machinery, and mill-work. Skilled miners earn from three to four dollars a day, the latter price being paid only to those who work in wet or dangerous places; and common, unskilled laborers are paid from two and a half to three dollars a day. Nobody is idle who is willing to work, and tramps and beggars are unknown.

Perhaps there is no want that is as keenly felt in Montana as that of good domestic help. A few years ago good house-servants, cooks, were paid sixty dollars per month, and even now a white girl who knows how to do housework receives from twenty-five to forty dollars a month—the former of these rates being paid only to servants of a very inferior kind. Both in Helena and Butte it is generally impossible to obtain white servants at any price, and the greater part of the housework in families is performed by Chinamen, who receive, on an average, about thirty dollars a month. The early settlers of Montana were exclusively men who were hunting for gold, and never expected to remain in the Territory after the mines first discovered failed to pay. When the population began to become permanent the few who had families sent for them, but the majority were unmarried men who had no families. For the last fifteen years, too, Montana has been so remote that comparatively few women have come here expecting to go out to service in families, and those who have come have almost invariably been married within a few months after their arrival.

Some of the experiences of young women who have been brought to Montana in the capacity of servants have been very amusing. A lady who brought a maid from Chicago two or three years ago told me that the young woman had five offers of marriage while travelling a week on a stage-coach between Corinne and Helena, part of them from passengers and part from stage-drivers. I have no doubt that several hundred good servants could now find employment in Helena, Butte, and other towns at the wages I have named, and that the majority of them would find good husbands within a year if they wished to marry.

The professions seem generally to be well filled in Montana, and clerkships in stores or offices are not very plenty. I have heard less about mining litigation in Montana than in any other place where mining operations are going on, and the lawyers, while in most cases making a living, are probably able to attend to all the business that offers. A few good physicians might make an opening for themselves here, and as the population increases their practice would of course become greater. Montana has many good schools, and they are generally in the hands of competent teachers, who are engaged in the States. There are frequent changes among the lady-teachers, because a large proportion of the whole corps in the Territory is married every year.

The merchants of Montana are, almost without exception, men of considerable capital. Until this year no one else could do business here, because the freight-lines were all closed in the winter, and it was necessary to carry a stock of goods large enough to last about nine months. Now that the Utah and Northern Railroad will be opened across the mountains next month, goods can be imported every month in the year, but as freights will always be higher during the season when the Missouri River is closed, merchants will continue to purchase goods during the spring and summer in sufficient quantities to last until the next summer, and will be able to undersell those who purchase in smaller quantities and pay higher rates for transportation.

The tide of immigration into this Territory has already received a new impetus, and next year a large increase of population is expected.

DISTANCES, TIME, FARE, BAGGAGE ALLOWED, EXTRA BAGGAGE, AND HOUSEHOLD GOODS.

FARES FROM OMAHA.

THE fares to Lovell's, Virginia City, Butte, Deer Lodge, Helena, and other central points in Montana are as follows: First class, $100; second class, $75; emigrant, $45. On the cars children five years old and under twelve, half fare in any of these classes; under five years old, free; on stages children under twelve and over three years old, half fare; under three, free. Passengers holding first-class tickets will be carried from the Utah and Northern Railway terminus by Gilmer, Salisbury & Co.'s stage-line with 40 pounds of baggage free. Holders of second-class and emigrant tickets will be transported from the Utah and Northern terminus by Gilmer, Salisbury & Co.'s line of covered wagons—carrying the United States mail—and will be allowed 50 pounds of baggage free.

EXTRA BAGGAGE AND HOUSEHOLD GOODS.

Extra baggage by stage or mail-wagon from the terminus of the Utah and Northern Railway to points named above will be charged fifteen cents per pound, but it may be forwarded by freight-wagons at a cost of from two to three cents, its transportation in this way, however, requiring considerably more time. Freights on household goods (*well boxed*) from Omaha to Utah and Northern Railway terminus, $4.05 per hundred pounds, or double that rate if carried in trunks. Freight rates from the railway terminus to Montana points above named are from $1.50 to $2.50 per hundred pounds.

Stages run day and night, making connections with Utah and Northern Railway trains daily. Mail-wagons also run daily. First-class eating-stations along the stage-road furnish meals or lunch at reasonable rates. Telegraphic stations are established at frequent intervals along the stage-road. All streams are well bridged, and the entire equipment of the stage-line is the finest in the West. The Utah and Northern Railway, completed to Beaver Cañon, Idaho, 274 miles north of Ogden, in September, 1879, is being rapidly extended northward into Montana. Unless winter opens unusually early, it will no doubt reach Red Rock, Montana, 30 miles north of Beaver Cañon, in December, 1879, reducing stage-travel to the more distant points named below to thirty-six hours. Following are the distances and the stage-time from Beaver Cañon to the principal points, as well as rates of fare from Omaha in force November 1, 1879:

	First Class.	Second Class.	Emigrant.	Distance.	Stage-time.
Lovell's, Montana,	$100	$75	$45	118 miles.	23 hours.
Virginia City, "	100	75	45	193 "	28 "
Butte, "	100	75	45	208 "	32 "
Deer Lodge, "	100	75	45	235 "	38 "
Helena, "	100	75	45	245 "	40 "

DISTANCES AND FARES IN THE TERRITORY.

The following are carefully-compiled tables of distances from Helena, Deer Lodge, and other points to all stations in Montana, with stage-fares in effect in June, 1879. Stages on nearly all routes run daily, making an average of over one hundred miles in twenty-four hours:

Route to Utah and Northern Railway—*Gilmer & Salisbury Stages.*

From Helena to—	Miles.	Fare.	From Helena to—	Miles.	Fare.
Clancy	18	$1 50	Salisbury.	90	$13 00
Jefferson	22	2 00	Virginia City.	120	16 00
Whitehall.	60	8 00	Lovell's	135	20 00
Silver Star	85	12 00	Railroad Terminus	294	

Deer Lodge, Butte, and Missoula Route—*Gilmer & Salisbury Stages.*

From Helena to—	Miles.	Fare.	From Helena to—	Miles.	Fare.
Sweetlands	25	$2 00	Pioneer	61	$8 00
Blackfoot	29	3 00	New Chicago	77	11 00
Deer Lodge	45	6 00	Phillipsburg	102	12 00
Butte, *viâ* Deer Lodge	80	8 00	Missoula	150	17 00

Deer Lodge and Lovell's Route—*Gilmer & Salisbury Stages.*

From Deer Lodge to—	Miles.	Fare.	From Deer Lodge to—	Miles.	Fare.
Warm Springs	18	$1 50	Camp Creek	75	$10 00
Silver Bow	35	2 00	Lovell's	115	
Butte	40	3 00	Eagle Rock.	284	

Bozeman Route—*H. F. Galen Stages.*

From Helena to—	Miles.	Fare.	From Helena to—	Miles.	Fare.
Radersburg	48	$5 00	Central Park	86	$10 00
Gallatin City	65	7 50	Bozeman	101	12 00
Hamilton	78	9 00	Virginia City	120	12 00

Bozeman and Tongue River Route—*Salisbury & Piatt Stages.*

From Bozeman to—	Miles.	Fare.	From Bozeman to—	Miles.	Fare.
Benson's Landing	30	$3 50	Etchetah	239	$28 50
Stillwater.	102	12 00	Rock Springs	283	35 00
Huntley	163	19 50	Ft. Keogh and Miles City.	337	42 00

Diamond City and White Sulphur Springs—*Marks & Patterson Stages.*

From Helena to—	Miles.	Fare.	From Helena to—	Miles.	Fare.
Cañon Ferry.	18	$2 50	Camp Baker	60	$7 50
Diamond City	35	5 00	White Sulphur Springs	78	10 00

Bitter Root Valley Route—*I. A. Robinson Stage-Line.*

Missoula to—	Miles.	Fare.	Missoula to—	Miles.	Fare.
Stevensville	28	$3 00	Skalkaho	51	$6 00
Corvallis	43	4 50			

VIRGINIA CITY AND BOZEMAN—*H. F. Galen Stages.*

Virginia to—	Miles.	Fare.	Virginia to—	Miles.	Fare.
Sterling	30	$4 00	Bozeman	75	$12 00
Central Park	60	8 00			

POPULATION, ALTITUDE, DISTANCES, AND FARES FROM HELENA, OF MOST PROMINENT POINTS.

Name of Place.	Miles.	Fare.	Altitude.	Population.
HELENA TO—	. . . .	. . . . . .	4266	5000
Butte	80	$8 00	5800	4000
Bozeman	101	12 00	4900	1000
Blackfoot	29	3 00	. .	200
Benton	144	15 00	2780	700
Clancy	18	1 50	. .	250
Camp Baker	60	7 50	4538	
Corvallis	193	21 50	. .	250
Deer Lodge	45	6 00	4546	1000
Diamond City	35	5 00	. .	200
Miles City	438	54 00	2600	800
Fort Shaw	84	9 00	4900	
Glendale	125	16 00	5200	500
Gallatin City	65	7 50	4838	100
Jefferson	22	2 00	4776	200
Missoula	150	17 00	3200	700
New Chicago	77	11 00	. .	200
Phillipsburg	102	12 00	. .	600
Pioneer	61	8 00	. .	200
Radersburg	48	5 00	4500	200
Salisbury	90	13 00	4900	100
Sun River	85	10 00	4850	100
Stevensville	178	20 00	. .	200
Virginia City	120	16 00	5713	1000
Vestal	24	3 00	. .	300
White Sulphur Springs	78	40 00	4957	200

AVERAGE WAGES IN THE EAST AND IN MONTANA.

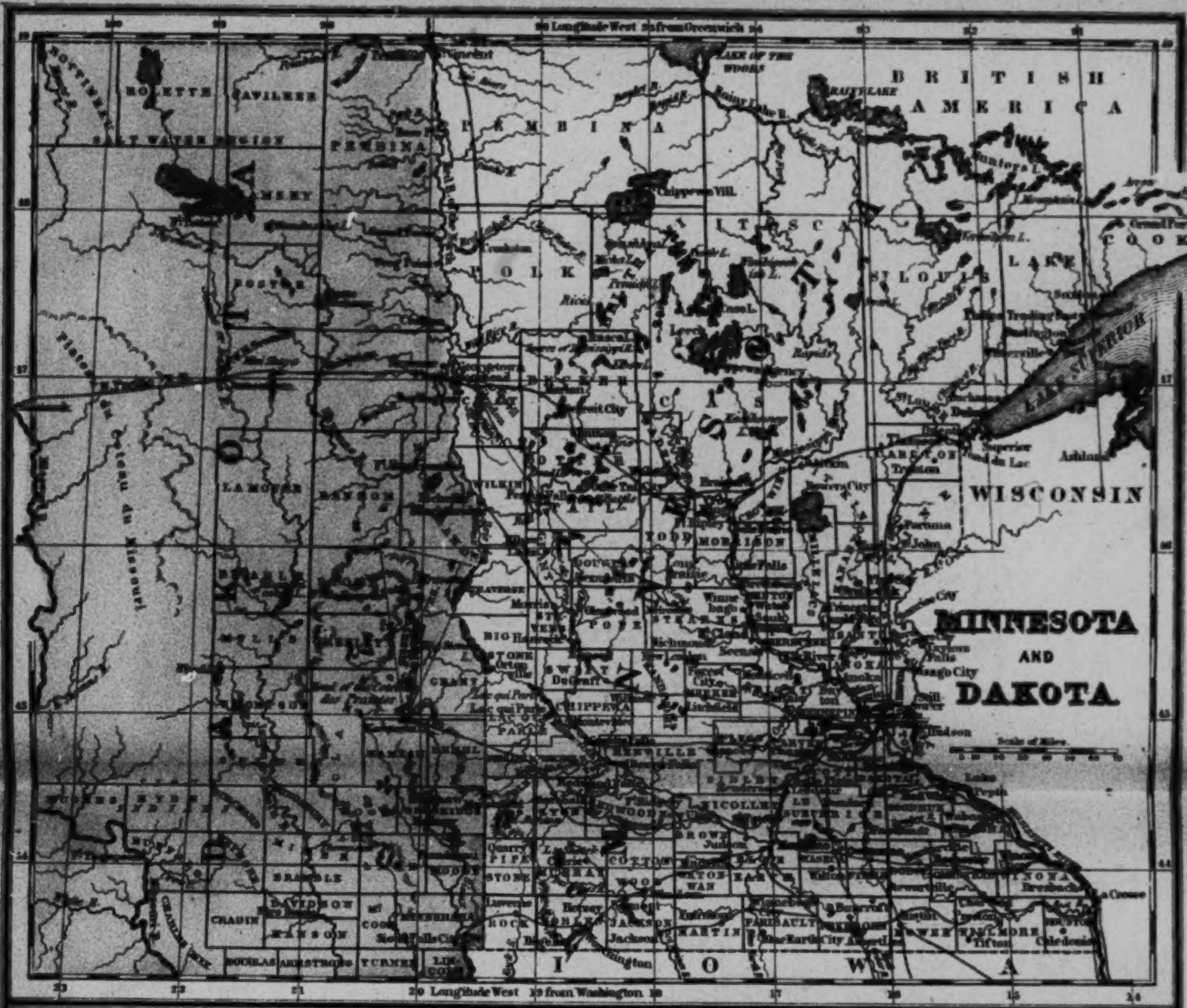
Employment.	In the East.	In Montana.
Bakers, per month and board	$25 00	$65 00
Blacksmiths, per day	2 50	4 50
Bookkeepers, per month	70 00	125 00
Bricklayers, per day	3 50	6 50
Butchers, per month and board	24 00	50 00
Brickmakers, " "	20 00	50 00
Carpenters, per day	2 50	4 50
First cook, per month and board	60 00	110 00
Second cook, " "	30 00	55 00
Cooks in families, " "	11 00	35 00
Chambermaids, " "	10 00	30 00
Clerks, per month	50 00	90 00
Dressmakers, per month	25 00	70 00
Dairymen, per month and board	25 00	45 00
Engineers in mills, per day	2 00	3 50
Farm-hands, per month and board	15 00	42 50
Harness-makers, per day	2 00	4 50
Hostlers, per month and board	15 00	45 00
Laundresses, " "	12 00	35 00

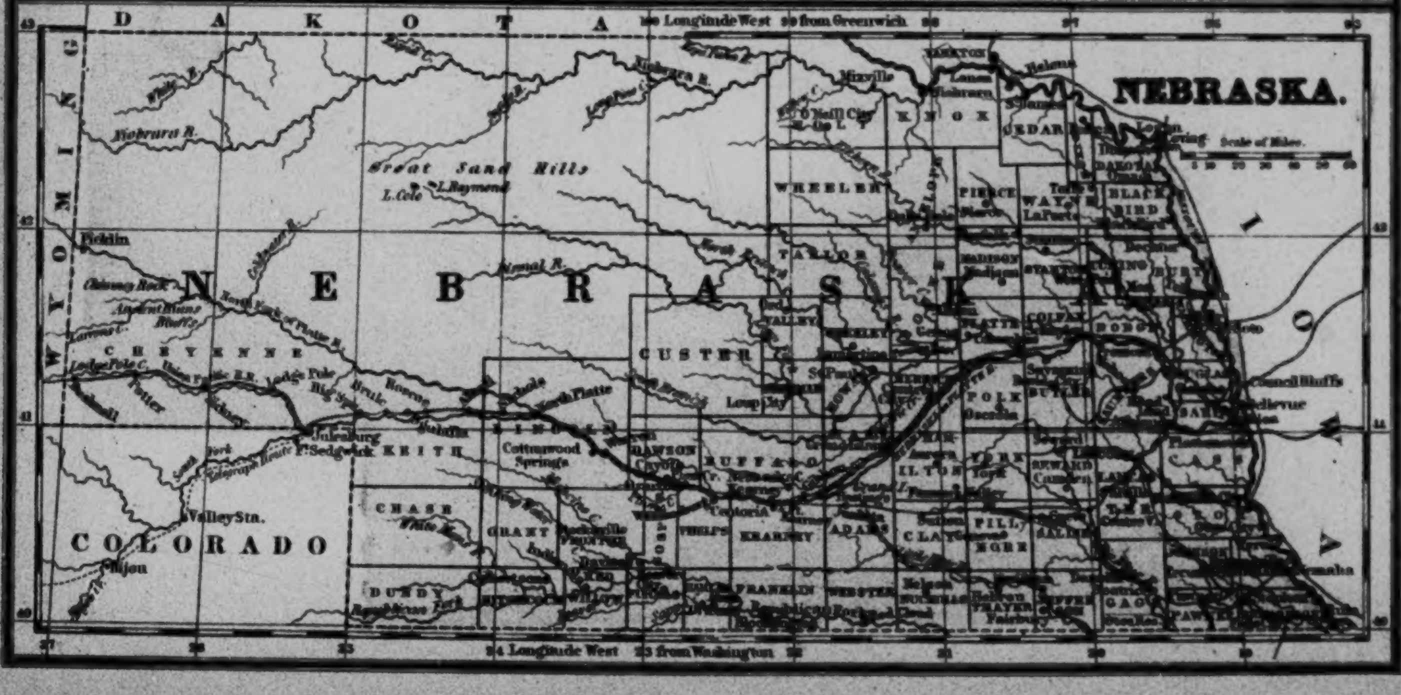
Employment.	In the East.	In Montana.
Laborers, per month and board	$15 00	$35 00
Lumbermen, " "	28 00	55 00
Machinists, per day	2 75	4 50
Miners, "	2 25	3 50
Millers, per month and board	25 00	65 00
Millwrights, per day	2 50	4 50
Painters, per day	2 25	4 00
Printers, per week	15 00	25 00
Plasterers, per day	2 50	5 50
School-teachers, per month	30 00	80 00
Servants, per month and board	11 00	35 00
Shepherds, " "	...	40 00
Stone-masons, per day	3 00	6 00
Teamsters, per month and board	18 00	45 00
Waiters, " "	16 00	55 00

DAKOTA.

DAKOTA, lying between latitude 42° 30′ and 49° north, and longitude 96° 20′ and 104° west, is bounded north by British America, east by Minnesota and Iowa, south by Nebraska, and west by Montana and Wyoming. The average extent north and south is nearly 450 miles, east and west, 350 miles. The area is 150,932 square miles. Dakota originally formed a part of Minnesota Territory, which was organized in 1849, being a portion of the Louisiana Purchase from France in 1803. In 1854 the Territory of Nebraska was formed, comprising a portion of what is now Dakota. The Territory of Dakota was organized by act of Congress approved March 2, 1861, and included the present Territories of Montana and Wyoming. In 1863 the Territory of Idaho was erected, comprising all that portion of Dakota west of longitude 27° from Washington. In 1864 the northern part of Eastern Idaho was organized as the Territory of Montana; at the same time the southern part, comprising 91,665 square miles, was transferred to Dakota, thus making the total area of the Territory at that date 240,597 square miles. By act of July 25, 1868, 89,665 square miles were taken from Dakota to form the Territory of Wyoming, being all of the above-mentioned 91,665 square miles excepting a triangular tract of 2000 square miles (between Montana, Wyoming, and Idaho, bounded north by latitude 44° 34′ north, east by longitude 34° west from Washington, south and west by the Rocky Mountains) which has since formed a part of Dakota, though widely separated from it. The first permanent settlements of whites were made in 1859, in what are now the counties of Clay, Union, and Yankton. The first Legislature convened March 17, 1862. Immigration was very limited until 1866.

Governor William A. Howard writes in his report for 1879 as follows: "Immigration this year has been large, far greater than in any former year, and this large increase extends to all parts of the settled portion of the Territory—perhaps about the same percentage of increase in each of


MINNESOTA
AND
DAKOTA.
Scale of Miles.
BRITISH AMERICA
WISCONSIN
IOWA
LAKE SUPERIOR
LAKE OF THE WOODS
PEMBINA
POLK
ITASCA
ST LOUIS
LAKE
COOK
Plateau du Coteau du Missouri
Longitude West 98 from Greenwich
Longitude West 19 from Washington


NEBRASKA.
Scale of Miles.
DAKOTA
WYOMING
COLORADO
IOWA
NEBRASKA
Great Sand Hills
CHEYENNE
CUSTER
KEITH
KNOX
WHEELER
Longitude West 99 from Greenwich
Longitude West 23 from Washington

the three divisions. South-eastern Dakota has had a very large increase of population. I am told by persons in whom I have confidence that as many as three hundred teams, immigrant wagons, have passed into the south-eastern part of the Territory daily through the summer. Quite as large a percentage has come into Northern Dakota. The same may be said of the increase in the Black Hills. In the absence of census returns it is impossible to state with accuracy our present population. The swelling tide of immigration spread over so vast a territory, much of it in unorganized counties, makes satisfactory estimates difficult if not impossible. Well-informed persons have estimated our population at 160,000, others at 170,000, and some as high as 180,000. At the present time I think it is at least 150,000, probably more than that. The immigration to the Black Hills has been large and of a very satisfactory character. They claim to have—and I think with good reason—from 25,000 to 30,000 inhabitants.

"Railroad facilities are being largely increased in Dakota. We have of completed railroad in the Territory about four hundred miles; this will be increased before January next to over five hundred miles. Several strong corporations are pushing their trunk-lines into this Territory at various places, as well to carry the products of our rich soil as ultimately to reach the Black Hills.

"It is but a short time since vast herds of buffalo roamed undisturbed over these prairies; now farms stocked with cattle and sheep everywhere abound. It is not long since we were taught in our Eastern homes and in our schools and learned from our geographies the story of the Bad Lands, the 'Great American Desert,' and were left to believe that Dakota for barrenness was only equalled by the Desert of Sahara, and that its chilling blasts were equal to the cold of Greenland; but since it has been demonstrated that Dakota has a soil exceedingly rich, has more arable and less waste land in proportion to its size than any State or Territory in the whole Union, and since millions of bushels of grain are already waiting transportation to the markets of the world, capital, proverbially timid, is stretching out its arms, and with hooks of steel is drawing to itself the carrying-trade of an empire."

Most of the Territory west and south of the Missouri River is unorganized. The oldest counties lie on the east part, along the Minnesota borders, and in the south-eastern, along the Missouri River. Yankton, the capital, is situated in the south-east corner of the Territory, on the Missouri. The greater portion of the white population is in the south-east part of the Territory, along the Missouri River; it is chiefly engaged in agriculture. The Territory of Dakota forms to a great extent the watershed of the two great basins of North America, the Missouri and Mississippi Rivers and the tributaries of Hudson Bay. The general surface of the country east and north of the Missouri is an undulating prairie, free from marsh, swamp, or slough, but traversed by many streams and dotted with innumerable lakes. A plateau, called the Côteau des Prairies (or Prairie Heights), with an average elevation of fourteen hundred and fifty feet above the sea, and a breadth of fifteen or twenty miles, extends for two hundred miles from the south along the east border, while a similar table-land of less height, the Plateau du Côteau du Missouri, occupies the middle and northern portion. The basin of the Red River in the north-east is covered with open grassy plains. In the south-west, near latitude 44°, and between longitude 103° and 105°, extending into Wyoming, are the Black Hills. They occupy in both Territories an area about one hundred miles long and sixty miles wide, or six thousand square miles. The base of these hills is twenty-five hundred or three thousand feet above the sea, and the highest peaks six thousand seven hundred feet. The Missouri River, which is navigable throughout its entire course in Dakota, traverses the Territory from the north-west to the south-east corner. Its largest tributary is the Yellowstone, which flows north-east through Montana, and joins the Missouri on the border of the two Territories, in latitude 48°.

NORTHERN DAKOTA,

as that portion north of the 46th parallel is commonly called, embraces about half of the present Territory, extending from Minnesota on the east to Montana on the west, and being about two hundred and fifty miles wide from north to south. This section has a rich soil, healthy climate, and is justly famous for its agricultural products. The Northern Pacific Railroad traverses this section, and thriving towns are rapidly springing up all along the line. Here are situated, in the Red River Valley, those immense farms of twenty thousand acres, all under cultivation for wheat. The most celebrated farm is Dalrymple's, which is managed as systematically as a railroad. The wheat-crop for 1879 from this one farm was 400,000 to 500,000 bushels. These rich lands may be called "bonanzas," for they will produce year after year, yielding an immense income. A traveller, describing this wonderful farm during harvesting, writes as follows:

"Just think of a sea of wheat containing twenty square miles—thirteen thousand acres—rich, ripe, golden, the winds rippling over it!

As far as the eye can see there is the same golden russet hue. Far away on the horizon you behold an army sweeping along in grand procession. Riding on to meet it, you see a major-general on horseback, the superintendent, two brigadiers on horseback, repairers. No swords flash in the sunlight, but their weapons are monkey-wrenches and hammers. No brass band, no drumbeat or shrill note of the fife; but the army moves on—a solid phalanx of twenty-four self-binding reapers—to the music of its own machinery. At one sweep, in a twinkling, a swath of one hundred and ninety-two feet has been cut and bound, the reapers tossing the bundles almost disdainfully into the air, each binder doing the work of six men. In all there are one hundred and fifteen self-binding reapers at work. During the harvest about four hundred men are employed, and during threshing six hundred, their wages being two dollars a day with board.

"The acres owned by Mr. Dalrymple are not one whit better than the average through the entire length and breadth of this valley, which is four hundred miles long and seventy wide, and which is fast filling with hardy settlers. Not only the lands of the valley, but the entire section between the Red River and the Missouri—a territory containing eighty thousand square miles in Northern Dakota alone, saying nothing of Montana and Manitoba—is adapted to the cultivation of wheat, oats, and barley."

The Northern Pacific Railroad, extending from Duluth, runs through the northern part of Minnesota, and is completed to Bismarck in Dakota. It is now in process of construction on what is known as the Missouri division, which will be 213 miles in length. The greater portion of the section through which it will run is fertile lands, though it passes through some *mauvaises terres*, or bad lands. Ultimately, the Northern Pacific will be completed through to the Pacific Ocean, and five years may see "the consummation devoutly to be wished."

EASTERN DAKOTA.

The prevailing soil in Eastern Dakota is a dark, calcareous sandy loam, with an intermixture of clay. This loam is mostly from four to six feet in depth, and has been found from fifteen to twenty feet. It is remarkably fertile. The corn-producing belt, which runs through Ohio, Indiana, and Illinois, extends north-west through Iowa, up the valley of the Missouri through Dakota. The bottom-lands bordering on this great river and its tributaries possess a singularly rich and uniform soil and furnish extensive and luxuriant meadows. All kinds of grain, fruit, and vegetables usually grown in the Middle States yield abundantly in Dakota. Indian corn has yielded 70 bushels an acre; wheat, 30 to 50; oats, 40 to 75; potatoes, 270 to 500; and barley, buckwheat, and other cereals, largely. Wild apples, plums, cherries, grapes, and hops grow abundantly along the streams in the Missouri Valley. It is believed that tobacco and sweet potatoes can be successfully raised on the warm bottom-lands of the south. Dakota possesses remarkable advantages for stock-raising. The plains are covered with nutritious grasses, which afford abundant pasturage throughout the year. The climate is specially favorable to sheep, and wool-growing promises to be an important industry.

THE BLACK HILLS

were in the heart of the Sioux country until February, 1877, and were so jealously guarded by the Indians that white people who visited them did so at the peril of their lives, though the Sioux did not live in the Hills, as they had a superstition that the Great Spirit never intended these mountains for the habitation of man. The terrific thunderstorms which are frequent here perhaps had something to do with this belief. The Sioux have known of the existence of gold in the Black Hills for many years. A third of a century ago, it is said, they showed to Father de Smet, the Roman Catholic missionary, who spent his life among them, and in whom they had implicit confidence, large nuggets which they had picked up in the gulches. He warned them not to show these nuggets to the white men, as it would arouse their cupidity and cause the Indians to be driven out of the country. Nevertheless, rumors of the mineral wealth of the Hills did get abroad, and evidence has been found that a few adventurers came here in search of gold many years ago, and actually began to work the placers. They were probably all massacred by the Indians.

Several government expeditions were made into the Black Hills before that of General Custer in the summer of 1874, and the report of each showed the presence of gold and other minerals. The first of these was that of Captain Bonneville in 1834. General Harney came in here in 1855, and the highest peak in the Hills was named in his honor. Other expeditions led by Warren visited the Hills in 1856–57, by Dr. Hayden in 1858–59, and by General Sully in 1864. General Custer's expedition in 1874 is still remembered by most newspaper readers. The practical miners who accompanied him reported excellent "prospects;" that is, that in washing out the gravel of the streams in pans they obtained gold in sufficient quantities to make it pay for working. The reports of these miners were received with incredulity in the East, and during the winter of 1874–75 the question was widely discussed whether there was gold in the Black Hills or not.

So great was the public interest in the discoveries reported by those who accompanied General Custer that in the summer of 1875 the Interior Department sent out an exploring expedition in charge of Professor Jenny, a young geologist. He came into the Hills with a train and escort, went pretty well over them, and made a map of the country. He discovered gold in many places, and more than confirmed Custer's reports of the previous year. Professor Jenny did not visit Deadwood and Whitewood Gulches, the timber being so thick that he could not get to them with his train. But the adventurous placer-miners of the West did not wait for a scientific report upon the country, but, braving the hostility of the Indians and other dangers, they began to settle along the streams in the Hills in the summer of 1875, and to wash out the gold-dust. The government forbade all persons to enter this country, and the President, I believe, issued a proclamation warning people against invading the territory that had been set apart for the Indians. But it is impossible to keep an old placer-miner out of gulches where there are "pay streaks;" he will go through fire and water to reach new diggings. Hundreds of men came in here in spite of the proclamation, and in spite of the orders to military commanders to arrest people found on the road or in the Hills. The soldiers even came to the Black Hills, and, going up and down the gulches, gathered up the miners, confiscated their provisions, and took them to Fort Laramie or to the military posts on the Upper Missouri. But the adventurers came in here faster than the soldiers could take them out, and most of those arrested, even, as soon as they were released—as they all were when a military station was reached—came directly back if they had money enough to procure provisions. The government, having told the people through its exploring expeditions that there was gold in the Black Hills, could not keep them out without sending its whole army to guard the avenues of approach, and the policy of forcible removal was abandoned about the middle of November.

Gulch-mining practically commenced in 1876, and quartz-mining one year later, and these three years have developed the fact that the Black Hills contain the largest area of moderately rich placers and the most prodigious deposits of gold ores yet discovered in the world. Gold-mines one hundred and fifty feet wide and traced for five miles are found only in the Black Hills. About seven thousand mines have been located, and it is estimated that the full development of those which are already proven rich will give employment to fifty thousand miners.

THE GOLD YIELD

has been as follows: in 1876, $1,500,000; 1877, $2,500,000; 1878, $4,000,000; and conservative estimates for 1879 place it at over $6,000,000. The shipments of gold-dust and bullion now average $250,000 per week. As in all other mining-regions, the Black Hills bonanzas have all been found by poor men, and leading sales made by these have been—Father de Smet, $400,000; Segregated Homestake, $100,000; Stand-by, $125,000; Gopher and Golden Terra Extension, $200,000; Old Abe, $250,000; Homestake No. 1, $70,000; Golden Terra, $80,000. Quartz-mills rivalling the best of Nevada and California have been built by the score, until now some fifty, with a total of about twelve hundred stamps, are in operation. Over $2,500,000 has been invested in mines and mills. The Aurora has yielded $130,000, the Homestake and De Smet each probably six times that amount, and $100,000,000 worth of "pay ores" are now in sight in the "bonanza belt," of which these mines are a part. The gold ores yield from five to thirty dollars per ton—although small streaks of almost pure gold are sometimes found—and are mined and milled at an expense of from two to four dollars per ton. Black Hills silver ores average much richer than the gold, and it is but a trifle more expensive to reduce them.

The best-developed gold quartz- and gulch-mines, and all the great mills, are in the immediate vicinity of Deadwood.

As a business-centre Deadwood is the metropolis of the Black Hills. It has a population of about five thousand; and the mining-towns in this vicinity, with the people who are prospecting in the gulches, cutting timber in the mountains, or farming in the fertile valleys within twenty-five miles of town, make the number who are more or less dependent upon it or contribute to its trade about twice as great. Every kind of legitimate business in Deadwood seems to be flourishing. Capital invested here brings much larger returns than in the East, and there are many promising openings besides those offered by the mines. Some idea of the magnitude of the business of the Black Hills may be gathered from the fact that during last year (from June 1, 1878, to June 1, 1879) there were brought in in wagons between twenty and twenty-two million pounds of freight. This, of course, included machinery for gold-mills, which is very heavy.

OPPORTUNITIES FOR INTENDING SETTLERS.

(1.) Are there opportunities in the Black Hills for the investment of capital in safe and profitable mines?

I think there are. The bonanzas of the Hills, thus far discovered, are in the hands of two California firms, which have brought to the development of the mines ample capital, long experience, and the best skill. Beginning not quite two years ago, every month's work which they have done has caused their property to increase in value, and to-day every one of the mines on the great belt shows a larger body of ore than at any previous time.

Any one who comes to the Black Hills expecting that he will have to deal with men who are not his equal in shrewdness and business-capacity will find himself woefully mistaken. There is no sharper, more wide-awake class of men anywhere than the prospectors and miners. They may be roughly clad and live far out in the wilderness in the rudest log cabins, and spend their days in shaft or tunnel patiently cutting through the rock by candlelight, but any one who expects to get ahead of them in a bargain must be up before sunrise. It is a good rule for the stranger in a mining camp not to judge men by their outward appearance. If he does he may mistake the millionaire owner of a bonanza for one of his mechanics.

(2.) What openings are there for prospectors and miners?

Prospecting is a trade or profession which can only be learned by actual practice or experience. I certainly should not think it wise for any one in the East to come here expecting to discover a new mine, unless he joins himself to some man who has been engaged in the business before. Those who are anxious to try their fortune in this way will find ample territory in the Black Hills which has not been fully explored. To be successful, however, the prospector should have one or two thousand dollars capital, and if he discovers a mine that promises well he will need a good deal more money to develop it sufficiently either to make it productive or marketable at much more than a nominal price. Good mines are scarce, and scores of prospectors fail to make their fortunes where one is successful.

The days of placer-mining in the Black Hills are over. A few of the gulches are still being worked, both here and in the southern portion of the Hills, but the returns are comparatively small. It is possible that companies will be formed to bring water from a distance to some of the dry placers in the southern section of the Hills, and that the rich diggings there may be made productive.

Miners—that is, men who work in the mines with hammer and drill—seem to have no difficulty in getting employment. Skilled miners are paid $3.50 a day, and common laborers $2.50. Engineers, amalgamators, and other skilled mechanics earn from $4 to $6 a day. I see no idle men anywhere, and as the mines are developed and the amount of ore taken out is increased, of course there will be an increased demand for labor.

In this same connection I may say that there is great activity in building in Deadwood, which is likely to continue, and I think that carpenters, bricklayers, plasterers, masons, etc. would have no trouble in finding work here. Bricks cannot be obtained as fast as they are needed. Woodchoppers are employed by the hundred to supply the mills with fuel. The remoteness of the Black Hills and the great expense of reaching them will probably prevent the labor-market from being over-supplied for some time to come.

CHANCES IN THE PROFESSIONS.

(3.) Are the professions full?

Deadwood seems to be full of lawyers, and while a few men or firms have the cream of the business, here, as elsewhere, all seem to be making a living. Mining gives rise to almost endless litigation. The man who discovers a mine discovers a lawsuit, and he who buys a mine generally finds himself the defendant against half a dozen adverse claims, which he must buy out or fight in the courts. Mining-litigation is generally very profitable to the lawyers; and in spite of the large colony of attorneys already here, I have no doubt that there is still room for others who are masters of their profession, clever, and industrious.

The number of physicians and surgeons does not seem to be large, but I presume those now here are able to attend to their practice. The climate is remarkably healthy.

Clergymen will find the Black Hills as yet little more than a missionary-field. Very few religious societies have yet been organized, and those are far from healthy. Deadwood still maintains much of the character of a mining camp in the general non-observance of the Sabbath and in the indifference of a large proportion of the people to religious services.

There are several mining and civil engineers and assayists here, all of whom seem to have plenty of employment. I have no doubt that there will be room for a few more. The best position for a mining engineer is that of superintendent of a good mine, but such places are, of course, not plentiful.

CORRECT TABLES OF DISTANCES.

The following are distances from Deadwood to all important points in the Black Hills. These are by the shortest wagon-roads; trails or bridle-paths reach all points in about one-third less distance. All camps are reached by either the Cheyenne and Sidney lines or their branches:

Deadwood to—	Miles.
Beaver	20
Bear Gulch	40
Belle Fourche River	30
Central City	2¼
Centennial	5
Castleton	30
Custer	56
Caves and Falls of Whitewood	5
Crook City	10
Crow Peak	22
Cold Springs	32
False Bottom	7
Forest City	43
Galena (Silver District)	12
Germania District	25
Harney	61
Hayward	64
Hill City	54
Inyan Kara	60
Jenny's Stockade	56
Lead City	4
Montana City	2
Mountain City	30
Oil City	67
Potato Gulch	42
Pactola	60
Rochford	66
Rockerville	59
Sand Creek	45
Spearfish City	12
Spearfish Falls and Cañon	14
Sheridan	42
Sitting Bull	40

DEADWOOD TO OUTSIDE POINTS.

Bear Lodge Mountains	85
Big Horn Mountains	235
Fort Robinson	150
Cheyenne	266
Fort Laramie	185
Fort McKinney	225
Miles City	250
Sidney	265
Redwater Coal-Mines	30
Omaha	674

DISTANCES FROM RAPID CITY.

Rapid City to—	Miles.
Crook City	35
Deadwood	42
Central City	44
Lead City	46
Galena City	30
Spearfish	47
Forest City	56
Pactola	13
Castleton	24
Sheridan	16
Hill City	22
Tigerville	26
Rockerville	12
Hayward	18
Harney City	20
Custer City	40
Rochford	24
Florence	26
Myers City	26
Ochre City	23
Golden Centre	25
Elkhorn City	27
Mountain City	41
Sitting Bull	26
Sturgis City	30
Fort Meade	28
Fort Robinson	108
Fort Laramie	143
Fort Pierre	160
Sidney	225
Cheyenne	260
Bismarck	275

BLACK HILLS ALTITUDES.

ELEVATION ABOVE THE SEA OF PROMINENT CITIES, MOUNTAINS, VALLEYS, ETC.

	Feet.
Inyan Kara Peak	6,500
Bare Butte	4,800
Floral Valley	6,196
Crook's Monument	7,600
Terry's Peak	7,200
Custer's Peak	6,750
Devil's Tower	5,100
Rapid City	3,175

	Feet.		Feet.
Crook City	3,725	Warren's Peak	6,900
Rochford (estimated)	4,500	Crow Peaks	6,200
Harney's Peak	7,440	Deadwood	4,425
Belle Fourche	3,734	Rockerville	4,125
Castle Creek Valley	6,136	Pactola (estimated)	4,000
Dodge Peak	7,300	Custer City "	4,200

POPULATION OF THE CITIES AND SETTLEMENTS.

	Population.		Population.
Deadwood	6,000	Central City	2,000
Golden Gate	700	Gayville	800
Lead City	2,500	Rapid City	500
Rockerville	600	Crook City	500
Rochford	600	Custer City	400
Sturgis City	300	Spearfish City	250
Sheridan	200	Hill City	200
Tigerville	200	Galena	250
Pactola, Hayward and other settlements			2,500
Total			18,000

MINNESOTA.

THE Indian name for Minnesota is "sky-colored water," in allusion to the river which gives its name to the State. Its length north and south is 375 miles, and its average breadth 250. It embraces in area 83,531 square miles, or 54,760,000 acres. To form an idea of the size, compare it with other States and countries. It is larger than the New England States and Maryland combined, and nearly as large as Ohio and Pennsylvania together. The acreage of arable land already surveyed, exclusive of the mineral and pine regions, is as large as the entire area of Illinois; one of the counties of the State, St. Louis, contains 4,000,000 acres.

The surface of Minnesota is, generally speaking, undulating in its appearance, and is a succession of plains and prairies, drained by an admirable water-system, with here and there heavily-timbered bottoms and belts of virgin forest. The distinguishing feature of the State is the wonderful chain of lakes and rivers which renders it in water-power without a rival in the Union. The mighty Mississippi here takes its rise, and drains a basin of eight hundred miles of country. The Red River of the North connects Minnesota with the immense and fertile regions of Manitoba, and the St. Croix, on her eastern border, provides that portion of the State with water-outlet for its products. It is hardly possible to describe the many beautiful lakes that dot the surface of the State and afford such an attraction to the tourist, invalid, and sportsman. Their fame has gone abroad. They abound in fish, while they present many charming scenes of natural beauty.

CLIMATE.

Though the general impression is of extreme cold and a rigorous winter, yet it is found that the temperature of this State is somewhat similar to that of New York. The isothermal line, which here trends to the north, has a marked influence on the climate of this State as well as of the adjoining Territories to the west.

The pure, dry atmosphere here offers a panacea to many ills contracted in more humid climates, and if the system is not too much exhausted by disease the vitality is restored. Indeed, one reason that the inhabitants can endure even the most extreme cold is the sense of elasticity and buoyancy imparted to the system by the dry and pure atmosphere.

SOIL AND PRODUCTIONS.

The soil is a dark loam, intermixed with sandy drift, and rests upon a stratum of clay. There is a remarkable uniformity throughout the State, inasmuch as it is nearly all an alluvial deposit, varying from one to five feet in depth. The exceptional district is on the north shore of Lake Superior, where the land is broken and unfit for cultivation.

WHEAT.

Wheat is the staple product of Minnesota, not because it is the only grain-crop that will mature, nor even for the reason that it is surer and its yield more bountiful, but simply because it always sells readily for cash. Whether the crop is scant or full, the farmer is safe in calculating his wheat as so much ready money as soon as he can get it to the market, and it usually brings a remunerative price. This is why the agriculturists of Minnesota have applied themselves mainly to the cultivation of wheat, and thus won for the State the deserved and almost world-wide reputation of producing wheat of a better quality than that grown in any other part of the United States, if not of the world. It is exceedingly rich in nutritive elements, and the flour made from it always commands the highest prices.

The average yield of wheat in this State ranges from about sixteen to twenty bushels per acre, and when, in connection with this statement, it is remembered that the area upon which it is grown includes one million eight hundred and fifty thousand acres, scattered over sixty-eight counties, extending about two hundred and sixty miles east and west and two hundred and eighty north and south, the magnitude of the yield can be more fully appreciated. It is rarely, if ever, that a season passes without more or less injury to crops resulting from local droughts, storms, or other causes in a region so extensive, and it must always be the case that amongst sixty-odd thousand farmers there are a good many who are negligent in tilling their lands and taking care of their produce. When a district of such immense extent shows an average yield of even twelve bushels per acre, the circumstance merits especial mention.

CORN, OATS, AND OTHER GRAINS.

Corn has been grown in the State since its earliest settlement, and it matures well and yields abundantly almost every season. In 1867 the area devoted to the cultivation was 162,722 acres, and in 1877 it had increased to 388,708 acres. For eight years, embracing the period from 1867 to 1874 inclusive, the average yield was thirty-two and a half bushels per acre. The oats grown in Minnesota are generally heavy and contain an unusual proportion of nutritive constituents. They are held in high esteem for the manufacture of oatmeal. In 1877 the quantity produced was 13,819,630 bushels, averaging thirty-nine and a quarter bushels to the acre. Rye yields an average of sixteen bushels. The barley of this State is renowned in the market for its weight, freedom from rust, and mature development. The general average was twenty-six bushels per acre for a number of years. Buckwheat averaged thirteen and one-eighth bushels. Timothy, clover, flax, and hemp grow here, while the wild grasses of the State are famous for the nourishment they contain. The three varieties are buffalo, herd, and blue-joint. They make excellent food for cattle, sheep, and horses.

Fruits and berries grow well; honey is in abundance throughout the State. Garden vegetables and melons are produced in great variety. Tobacco is grown in fifty-nine counties, and in 1877 there were 38,839 pounds raised. This ought to be accepted as sufficient evidence of the length of the season, for it is well known that the plant matures slowly. Amber corn is also grown, and has been made a success.

STOCK-RAISING.

The richness and abundance of the native grasses and the wide ranges of free pasturage in Minnesota naturally attracted the attention of cattle-growers at an early day, and experiments in every instance proved remarkably successful. It was found that the pasturage frequently continued fair until about the middle of November, and in the spring the grass grew rapidly, so that the feeding-season was but little, if any, longer than in Illinois or Missouri, and there was no more necessity for grain-feeding than in districts farther south. This success has led many persons to engage in raising cattle, and the business has already become important, involving in the aggregate a large investment of capital.

The same causes which make Minnesota an excellent country for raising neat cattle also adapt it for growing sheep and wool. The feed is abundant in quantity, superior in quality, and procured cheaply. Sheep require to be cared for in winter, and sheds with high roofs and good ventilation are necessary for the best condition of the flocks. They are not liable to foot-rot, catarrhal affections, and various other ailments, as in moister climates; their wool is heavier and grows thicker and of finer fibre, because of the greater warmth required in this natural covering in the regularly cold winters of this latitude.

MANUFACTURING.

No State in the Union is richer than Minnesota in capabilities for manufacturing. At Minneapolis the St. Anthony Falls of the Mississippi River afford a water-power of magnificent available capacity. It is already utilized by nineteen flouring-mills, with an aggregate of two hundred and twenty run of stone and capacity for the manufacture of about one million six hundred and fifty thousand barrels of flour per year; by twenty saw- and shingle-mills, with eighteen gang, twenty-five double circular, and a number of smaller saws; and by manufactories of cotton and wool, farm-machinery, etc. The St. Croix River, above Stillwater in Washington county, and especially in the vicinity of Taylor's Falls in Chisago county, affords a series of superb water-powers, in the aggregate equalling, if not surpassing, that of St. Anthony Falls. These are partially improved now in running flouring- and saw-mills and other machinery, and with the rapidly-increasing railroad facilities which are being afforded that section of the State, and the constant large additions made to its population annually, they will no doubt be much more extensively employed in the early future. At Fergus Falls, on Red River, is another extraordinary power, computed to be equal to over twenty thousand horse-power, all of which can be easily and cheaply made available. It is not yet improved to any considerable extent, but will be during the current season. A good deal of flour is already manufactured there for home consumption and to supply the Manitoba market. At Granite Falls, on the upper Minnesota River, in Yellow Medicine county, is still another of over twelve thousand horse-power capacity, improved partially, there being two flouring-mills in operation there. Another power of extraordinary capacity, and easily and entirely made available, is found on the St. Louis River, near Thomson, in Carlton county. This is about to be improved somewhat extensively for sawing lumber, as it is adjacent to an extensive pine-region.

Three of the above—viz. that at Minneapolis, that on the St. Croix, and that on the St. Louis River justly deserve to be called gigantic powers, while the others already mentioned, and one at Sauk Rapids in Stearns county, another on the Cottonwood in Brown county, and perhaps a dozen more in as many different localities, are very extensive and valuable powers. Most of these are wholly unimproved, and probably the full capacity of none is yet made available. Houston county has a fine power of very considerable capacity on Root River, and there are several others on that stream in that and Fillmore counties. On the Zumbro River there are four or five extensive powers, and on the Cannon some eight or ten. Indeed, there are several hundred streams scattered all over the State which afford four or five times the water-power needed for the districts adjacent to them. On looking over the *Statistical Report* for 1878, it is found that sixty-three counties reported four hundred and fifty-two flour mills. These probably manufacture about five million five hundred thousand barrels per year. All but about five hundred thousand barrels of this, which is the product of steam-mills, is the result of the water-power of the State now improved; and besides this there is an immense manufacture of lumber accomplished by the same agency, and a good many other factories derive their motion from this source; yet hardly one-twentieth of the capacity of the water-power of the State has been made available. Every county in the State, it is believed, has more or less available water-power within its borders.

This widely-diffused and immense mechanical force gives ample opportunity for Minnesota to send all the products of her fields, flocks, forests, and mines to market in their prepared condition, thereby avoiding expense of transportation on the refuse portions, saving for her own use those parts which are not profitably marketable, and giving employment to thousands of her citizens in the mechanical departments of industry, thus securing to the State the greatest possible share of the profits accruing from her products.

MINNESOTA FLOUR.

In the foregoing article on the manufacturing capabilities of the State incidental mention is made of the already extensive milling interests. No data are obtainable at the moment from which to derive an approximate idea of the amount invested in this single business, but it is necessarily very large, for a number of our Minnesota mills are the finest in the world. Those at Minneapolis are especially noticeable, and are visited by persons who come here from the Eastern States as objects particularly worthy of curiosity. At Stillwater, St. Paul, Red Wing, Cannon Falls, Northfield, and Lanesboro', and on the Zumbro River and at Sauk Centre, Mankato, Fergus Falls, and several other points, are others less extensive, but still of considerable dimensions and expensive construction, and in most instances supplied with all the recently-improved machinery and apparatus for the manufacture of the best description of flour. The flour manufactured of Minnesota wheat and by mills in this State has for years ranked highest in the Eastern and foreign markets, and commanded the best prices, and for the past two or three years has been in especial demand for shipment to Europe. About a year ago orders began to be received by the millers here directly from foreign dealers, for the double purpose of making sure of obtaining the flour desired and saving the additional expense of commissions and forwarding charges at Eastern ports. This trade has grown rapidly, Minneapolis alone having shipped last year 109,183 barrels direct to foreign ports, and several other mills considerable quantities; and it continues to increase, thus augmenting the ability of the millers to pay higher prices for the wheat, and in that way contributing to benefit the agriculturists of the State. From the satisfaction which has so far been given to both shippers and receivers, there is no doubt that this direct trade will continue to grow until it covers the entire quantity of Minnesota flour sent to Europe.

The estimated population of the State is 800,000, but the rapidly-increasing immigration will largely swell that number in the next few years. The building of the Northern Pacific Railroad opened to easy access a vast fertile territory, which is yielding under cultivation prodigious quantities of wheat. The many railroads now in course of construction, penetrating new fields, with those but recently built, offer to the immigrant many strong inducements in the choice of valuable lands. The government also offers great inducements in public lands. From the present outlook it is not unsafe to assert that Minnesota will be one of the great manufacturing as well as agricultural States. The cities of St. Paul and Minneapolis have grown wonderfully within the past few years, while the future is most flattering for a still larger increase, and they can be taken as an index of the growth of the State at large.

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THE KANSAS EMIGRANTS.

We cross the prairies, as of old
  The Pilgrims crossed the sea,
To make the West, as they the East,
  The homestead of the free.

We go to rear a wall of men
  On Freedom's southern line,
And plant beside the cotton tree
  The rugged Northern pine.

We're flowing from our native hills
  As our free rivers flow;
The blessing of our mother-land
  Is on us as we go.

We go to plant our common schools
  On distant prairie swells,
And give the Sabbath of the wild
  The music of her bells.

Upbearing, like the ark of old,
  The Bible in our van,
We go to test the truth of God
  Against the fraud of man.

No pause nor rest save where the streams
  That feed the Kansas run—
Save where our Pilgrim gonfalon
  Shall flout the setting sun,

We'll tread the prairie as of old
  Our fathers sailed the sea,
And make the West, as they the East,
  The homestead of the free.

KANSAS.

GEOGRAPHICALLY speaking, Kansas is the central State of our American Union, lying between the meridian of 94° 38′ and 102° of west longitude, and between the parallels of 37° and 40° north latitude. It is bounded on the north by Nebraska, the 40th parallel forming the line of division; east by Missouri; south by the Indian Territory; west by Colorado. Its area is stated by the General Land-Office as 81,318 square miles, or 52,043,520 acres. Its length from east to west ranges from 391 to 410 miles; its breadth from north to south is 200 miles. The State has no mountains, but, though there are extensive prairies, it is far from being monotonous. There are everywhere low hills or gentle undulations. The surface of Eastern Kansas is chiefly undulating, and presents a succession of rich prairies, grass-covered hills, and fertile valleys, with an abundance of timber on the streams. The western half is not so diversified in its scenery, but has a rolling and varied surface. No Western State has so conspicuous a history as Kansas, and this sketch would be incomplete without at least a mention of a few facts connected with its eventful career.

HISTORY OF KANSAS.

That portion of Kansas lying east of the 100th meridian formed part of the Louisiana Purchase of 1803, and was included at different times in Louisiana and Missouri Territory. By the Missouri Compromise Act of 1820 in all this region lying north of latitude 36° 30′, excepting only such part thereof as was included within the limits of the State of Missouri, slavery was prohibited. As a result of the Mexican war, the territory of the United States was extended from the 100th meridian westward to the Pacific as far south as 32° 30′ north latitude. In 1853 settlers had already entered the territory in such numbers that Congress was called upon to protect them from the Indians. With the increase of immigration it soon became evident that the fertile lands of Eastern

Kansas were to be objects of contention among the friends and opponents of slavery; the latter contending that by the Missouri Compromise this region was to be exempt from slavery, while the former claimed it on the ground of partial repeal of that Compromise in 1850 and the attending circumstances arising from the accession of new territory in 1848. Both sides were terribly in earnest. In Massachusetts and Connecticut an emigrants' aid society was chartered, with ample funds, in 1854, to assist emigrants to remove to Kansas and to furnish them with weapons of defence against those who might attack them. In 1854, Congress passed the Kansas and Nebraska Bill, organizing these two Territories, and expressly declaring that the Missouri Compromise of 1820 was inoperative and void in regard to them. As thus organized, the two Territories extended to the Rocky Mountains, taking in considerable portion of Colorado. The emigrants forwarded by the emigrants' aid companies entered this Territory in very considerable numbers in the spring and summer of 1854. They were generally resolute men, able and willing to contend for their new homes; but the pro-slavery men of Missouri and Arkansas were as determined to secure the prize for themselves; and a series of raids and conflicts ensued, lasting for four years or more, in which many settlers as well as invaders were killed. Lawrence was twice besieged and burned; Pottawattamie, Ossawattamie, and Leavenworth were partially destroyed; the polls invaded and broken up; legislatures disturbed, their members and officers arrested and imprisoned; and the Territory kept in a constant state of turmoil. Governor after governor was appointed by the Presidents. President Pierce appointed Governor Reeder, and President Buchanan appointed Governors Shannon, Geary, Walker, Denver, Medary, and Stanton; but each in turn became convinced of the justice of the cause of the settlers, and so incurred the displeasure of the "Border Ruffians," as the invading party was called, and for various causes they resigned or were removed.

Four successive constitutions for the Territory were voted upon between December, 1855, and October, 1859. The first, known as the "Topeka Constitution," prohibited slavery, and was adopted in December, 1855, with very little opposition, but its authority was never recognized by pro-slavery men, very few of whom, however, were legal voters. The second, called the "Lecompton Constitution," was drawn up by a convention never authorized by the people and composed almost entirely of Atchison's followers, the Free State men refusing to vote, and only two thousand out of more than ten thousand votes being cast for it. The convention met at Lecompton in the autumn of 1857, and the constitution prepared by it had four sections relating to slavery—prohibiting emancipation, conferring upon slaveholders all the immunities of the worst slave codes, and declaring these inviolable, and preventing any change in this constitution before 1864. The only alternative left to the people was to vote for this constitution (which was otherwise objectionable) with or without the slavery sections. The Free-State men generally refused to vote, and the constitution was declared to be adopted by about five thousand six hundred majority, the greater part known to be fraudulent. On January 4, 1858, the people had an opportunity of voting against it at the Territorial election, and there was a majority of 10,226 votes against it. On August 3, 1858, Congress ordered another vote on this constitution, and it was rejected by over ten thousand majority.

Another constitution had been made by a constitutional convention in April, 1858, and had been adopted by a small vote. As it was not quite satisfactory, a fourth convention met at Wyandotte, July 5, 1859, and adopted the present constitution of the State. This was ratified by the people October 4, 1859, by about four thousand majority.

Kansas was admitted into the Union as a State on January 29, 1861, and its subsequent history has been one of great prosperity. During the late civil war no State sent so large a proportion of its male population as Kansas. Its growth since the war has been without a parallel for its rapidity. Its population in 1860 was 109,000; it is now, according to the returns of 1878, 849,978.

THE GEOLOGY OF KANSAS.

BY PROF. B. F. MUDGE.

THE average altitude of Kansas above the level of the sea is 2375 feet, according to the "List of Elevations" by Henry Gannett, one of Professor Hayden's reporters connected with the geological survey. The highest level is in Cheyenne county—about four thousand feet.

By an inspection of the State map it will be noticed that the rivers drain the country in a southerly and easterly direction. The valleys of the Arkansas, Smoky Hill, and Solomon Rivers, in the western half of the State, flow at quite different altitudes and rates of descent. The upper part of the valley of the Smoky Hill is from three to five hundred feet above the corresponding portions of the Arkansas Valley, and the upper valley of the Solomon is from one to two hundred feet higher than the Smoky. These rivers drain the country in a south-easterly and southerly direction, and their descent is gradual, without a waterfall in the State seven feet in height. The average descent of the Arkansas is a little over six feet to the mile, while the Smoky is seven and the Solomon nearly ten feet to the mile. On the upper portions of the latter two rivers the descent is much greater than on the last hundred miles. This is seen in the Smoky, which enters Kansas five hundred feet above the Arkansas, but when it unites with the Saline River it has come down to the level of the Arkansas in the same longitude.

The surface for the most part is a gently-rolling prairie, with few steep hills and bluffs, and the ravines are not often precipitous or deep. In the unsettled portion of the State, where there are no roads, the traveller has no difficulty in crossing the country in any direction; even where the rivers have rapids a mill-dam can rarely give a fall of more than ten feet.

The soil of both valley and high prairie is the same—the fine black, rich loam so common in the Western States. The predominating limestones by disintegration aid in its fertility, but the extreme fineness of all the ingredients acts most effectually in producing its richness. On the high prairie it is from one to two feet deep; in the bottoms it is sometimes twenty feet. A few exceptions to this general rule of fertility exist in the most western and south-western counties, but they constitute only a small proportion of the whole. The State is so well drained that there are very few valleys with stagnant ponds, and there is not a peat-swamp of fifty acres within its boundaries.

A very common opinion prevails that the lands lying near the Colorado line contain numerous alkali springs, and that the surface is sometimes covered by white alkaline deposits. This is a mistake. During fifteen years' aquaintance with this part of the State I have seen but two springs appearing to contain that substance, and never found ten acres where the vegetation had been injured by it.

From all the facts collected in various parts of the State relating to the geological formations found here, we conclude without hesitation that there is nowhere to be seen any violent disturbance of the strata, or even any slight metamorphic action in any of our deposits. The uplifting of this State and the adjoining country from the level of the ocean must have been slow, uniform, and in a perpendicular position. This may have been as slow as that now going on in Florida, or a rise of five feet in a century. From our knowledge of the geology of the West, this undoubtedly took place after the rise of the Rocky Mountains, and probably did not come to a close until the Drift period, as the channels cut by the rivers are large and often through earlier processes, and may date still farther back in geological history.

The most abundant and best building material in the State is limestone. One of the most valuable natural products is gypsum (or sulphate of lime), which is found in many places in Kansas. The supply of salt in the State is so abundant that if developed it would meet the demand of the whole Valley of the Mississippi, even if the population were tenfold greater than at present. Lead and zinc have been discovered in the south-eastern portion of the State. There has been some mining, and the towns of Galena and Empire City, embracing a population of three thousand inhabitants, are the result of the development of the mines. The geological formation of Kansas is entirely different from that producing gold and silver, except when combined with lead. All reports, therefore, of the discovery of the precious metals must be false. Some "mines" reported may be "salted." Coal has been found in large quantities. The thickest and best seam of coal in Kansas is the Cherokee bed, found in Cherokee, Crawford, and Labette counties; it cokes well and is a good gas coal. It is used for smelting, and preferred to the celebrated "black coal" of Illinois.

WHEAT.

THE relative increase and importance of winter and spring wheat can be realized in the statement that in 1872 the acreage for winter wheat was 247,605 acres, and the product was 2,172,595 bushels; for spring wheat the same year the acreage was 64,159; product, 889,346 bushels. In 1877 the acreage was 859,125, and product 10,800,295 bushels for winter wheat, and acreage 206,868, and product 3,516,410 bushels for spring wheat. In 1878 the acreage for winter wheat was 1,297,555, product 26,518,955 bushels; for spring wheat, acreage 433,257, and product 5,796,403 bushels. An analysis of the foregoing figures furnishes many interesting results which indicate clearly to the farmer the relative adaptability of the State for winter and spring wheat. The percentage of increase in acreage of winter wheat from 1872 to 1878 was 523.06; of spring wheat, 675.28. The increase in a single year from 1877 to 1878 in the aggregate acreage of the two crops was six hundred and sixty-six thousand eight hundred and nineteen acres, and is without parallel in the history of wheat production in the United States. Kansas ranked twenty-fourth among the States in 1866, nineteenth in 1870, eleventh in 1875, and eighth in 1870, in wheat production.

In rye, the total acreage in 1878 was 128,000, and the product 2,470,000 bushels. The main corn-belt of the State—that is, the sixteen counties having upward of fifty thousand acres in corn—lies almost entirely upon the eastern borders of the State, the bulk in the south-eastern counties, and thence extending throughout the eastern border counties to Doniphan and Brown in the extreme north-west. The acreage in corn for 1878 was 2,406,000, and the product in bushels was 81,563,400; total value, $15,497,046. The barley crop for 1878 yielded 56,255 bushels. The increase of oats acreage was very large in 1878—444,191; while in 1877 it was but 310,226—a gain in one year of thirty per cent.

HORTICULTURE.

The State produces abundantly of all the fruits that are found in a corresponding latitude in the East, as apples, pears, peaches, plums, cherries, and the smaller fruits and different varieties of berries.

The State encourages timber-culture. The planting of orchards has been found to be most successful upon the uplands in preference to the lowlands.

STOCK-RAISING.

This has grown to be an immense business, yet the rapid settlement and the occupation of the lands have confined the grazing-regions to the far western portion of the State. The greatest part of this business is in Texas cattle, in raising or in droving from Texas and shipping directly East, though the State has a quarantine law for protection of native cattle, and this trade is therefore under some restriction. To give a more general idea of the management and magnitude of the business, we quote from a writer on the subject, who refers to 1877 in his comparisons, and also to the south-western section of the State, in the Arkansas Valley:

"The total 'drive' from Texas in the spring and summer—May 15 to July 15—was 280,000. Of these 100,000 went North to the Union Pacific country, some 60,000 were held in South-western Kansas, and the remainder shipped East. In 1873, in the country south of Great Bend and Dodge City—Great Bend being then the cattle-shipping point—to the State line there were not to exceed ten thousand cattle upon the range. In 1874 there were about 25,000, in 1875, about 35,000, in 1876, 45,000, and last year (1877), as hitherto stated, 60,000. In addition to the thousands wintered in South-west Kansas last winter, there were some 30,000 in the northern part of the Pan-Handle of Texas and tributary to the Santa Fé road.

"Of the 'drive,' the early cattle are usually in the best shape, because these come from Northern Texas and have a shorter drive. They are also a better class of beeves than coast-cattle, which are coarser and longer horned. The profit in the business of purchasing either class of cattle with judgment is owing to the little expense from the country being so peculiarly adapted to stock—such nutritious grasses, plenitude of spring water that never freezes, and no outlay for shelter or feed. The change of climate adds immensely to the condition and value of the cattle, for here they take on fat readily, having no troublesome flies or extremes of heat to annoy and debilitate them. Texas two-year-olds can be grazed and fattened here for one year, and sold at three years old for from eighty to one hundred per cent. profit. The ruling rates at Dodge City prove this beyond all question; as, for instance, Texas two-year-olds sold last summer for fourteen dollars, and the same beeves wintered and grazed in Kansas until the present year, when they are of course three-year-olds, sell for twenty-four dollars. And now the question naturally arises as to the expense of the year's keeping. There are almost any number of parties with herds of their own upon the range, and it being practically unlimited, the expense of adding to the extent of the herd is simply one of increased help; and as herders' wages per month average about twenty-five dollars, the item is not of very great proportions. It is a common practice for other owners, non-residents or those not caring to devote their time individually to their cattle, to place their herds with those of parties attending personally to the stock upon the range, and the ruling rates governing such proceedings are two dollars each for yearlings and two dollars and a half each for cattle two or more years old. Each owner's stock is branded with his own recorded brand, hence there can be no trouble as to proprietorship; and as the owner of the main herd recognizes it as his best interest to take the best possible care of his own stock and the combined herd grazing in common, there can be no discrimination, and all in the herd necessarily receive equal attention. Generally, three or four owners giving their time to the care of the cattle lay claim by right of occupation to some particular range with running streams of water permeating it, and driving their stock upon it locate their camps or cabins at equidistant points. Twice a day, every morning and afternoon, the entire limits of this range are visited, some one riding in both directions from each habitation, and, meeting at half-way points, retrace their respective routes to starting-places, this being called in herdsmen's parlance 'riding the range.' Thus the range is patrolled every day in the year, and the cattle not only prevented from roaming beyond the particular range upon which they are placed to graze, but all outside intrusion guarded against. The percentage of loss by death during the year will not exceed two per cent., and one can figure for himself what his profits would be upon an investment in Texas two-year-olds at fourteen dollars per head, paying two dollars and a half per head for their keeping, allowing two per cent. for loss, and selling them at three years old for twenty-four dollars per head.

SHEEP-HUSBANDRY.

Time may develop the fact that for sheep-growing Kansas may be divided into two or three belts by lines drawn north and south, thus forming the eastern, middle, and western belts—the first, or eastern one, more especially adapted to the larger mutton-sheep, the middle to the medium or mixed breeds grown for wool and mutton both, and the western belt to the larger flocks of fine-wool sheep, made up of the merino and its crosses on the common sheep. The smaller farms, with less free range, and the nearer markets for mutton, point to the possibility of the larger breeds being more profitable in the eastern portion of the State. Just what influence the increased altitude of the western portion of the State will have upon the health of flocks cannot, with the limited experience of a few years, be yet determined. It is safe, however, to say that the general truth developed by the experience of Kansas breeders is, that the high, well-drained prairies of the State have been found, for obvious reasons, the healthiest. It will be seen that the breeders from the extreme western counties report their flocks more than ordinarily free from disease. The marked improvement in the weight of both the fleece and the carcass in Kansas in flocks which have been removed from other States is a point worthy of special notice. The almost unlimited range to be found in the western portion of the State presents advantages for extensive flocks, and opens a field for the investment of surplus capital which will not long be neglected.

LIVE-STOCK.

[FROM THE REPORT OF THE STATE BOARD OF AGRICULTURE.]

THE advance Kansas has made of late years among the other States of the Union in aggregate value of live-stock is a very interesting study, the reports of the Department of Agriculture (from 1866, and including 1876) showing in this wise: In 1866, Kansas was the twenty-ninth State in the Union, ranking only Florida, Nebraska, Delaware, and Rhode Island. In 1867 she was also the twenty-ninth, with Louisiana added to the other four below in rank; in 1868, the thirty-first, Louisiana stepping to the twenty-ninth, and California coming in the first time and assigned the twelfth place. In 1869, Oregon was added to the list, and Kansas went to the twenty-fifth place, Maryland falling from twenty-fourth to twenty-sixth, Minnesota from twenty-sixth to twenty-eighth, West Virginia from twenty-seventh to twenty-ninth, South Carolina from twenty-eighth to thirtieth, and New Hampshire taking Kansas's old place, the thirty-first. In 1870, Kansas made another long jump, this time reaching the nineteenth place, and forcing Massachusetts, who held it, to go to the twenty-first. Connecticut fell from twenty-third to twenty-ninth, Arkansas from twenty-first to twenty-second, and Maine from twenty-second to twenty-seventh. In 1871, Arkansas took the nineteenth place, and Kansas went down a peg to the twentieth, but there were still behind her several of the oldest States in the Union. In 1872, Kansas left Arkansas undisturbed in possession of the nineteenth place, but quietly jumped over her to the eighteenth place, forcing New Jersey out of it and to the twentieth place. In 1873, Kansas ousted Alabama from the sixteenth place, and put behind her, for the first time, Mississippi and Alabama. In 1874, though the grasshoppers did play such havoc with things generally, Kansas lost but four pegs, settling in the twentieth position, New Jersey taking the sixteenth, Mississippi the seventeenth, Minnesota the eighteenth, and Alabama the nineteenth, while behind Kansas were Massachusetts, Maine, Vermont, and a host of old States. In 1875, Kansas bounded over Minnesota, Mississippi, New Jersey, and Alabama, and regained the sixteenth place, hugging Virginia and Georgia very close for their positions just above her. In 1876 (the latest report issued by the department) Kansas went to the seventeenth place, Minnesota again creeping by her. Once more Kansas pushed the two States just ahead of her, Virginia and Georgia, exceedingly close for their places, the sixteenth and fifteenth respectively. During all these years but one (1873) New York was first. Illinois was fourth until 1869, when she went to third place. In 1870 she went to second place, and has remained there ever since, with the exception of 1873, when she took first place from New York.

The following tables contain an enumeration of live-stock for the year 1877–78, and the increase and decrease during the year:

LIVE-STOCK.

	Horses.		Mules and Asses.		Milch Cows.	
	Number.	Value.	Number.	Value.	Number.	Value.
Total in 1875 . .	207,376	$9,875,245.12	24,964	$1,622,660.00	225,028	$5,747,215.12
Total in 1878 . .	274,450	16,467,000.00	40,564	3,042,300.00	286,241	7,442,266.00
Increase . . .	67,074	$6,591,754.88	15,600	$1,419,640.00	61,213	$1,695,050.88
Per cent. of increase in 5 yrs.	32.34	. . . . . .	54.47	. . . . . .	27.20	

	Other Cattle.		Sheep.		Swine.	
	Number.	Value.	Number.	Value.	Number.	Value.
Total in 1875 . .	478,295	$9,039,775.50	106,224	$247,501.92	292,658	$2,077,871.80
Total in 1878 . .	586,002	12,423,242.40	243,760	731,280.00	1,195,044	6,094,724.40
Increase . . .	107,707	$3,383,466.90	137,536	$483,778.08	902,386	$4,016,852.60
Per cent. of increase in 5 yrs.	22.52	. . . . . .	129.48	. . . . .	308.34	

In the eleven years from 1866 to 1876 the following changes occurred in the positions of the States: New York, first in 1866, and also first in 1876; Ohio, from second to third; Pennsylvania, third to fourth; Illinois, fourth to second; Indiana, fifth to sixth; Iowa, sixth to fifth; Michigan, seventh to ninth; Wisconsin, eighth to eleventh; Kentucky, ninth to twelfth; Missouri, tenth to eighth; Tennessee, eleventh to thirteenth; Texas, twelfth to seventh; Virginia, thirteenth to sixteenth; Georgia, fourteenth to fifteenth; New Jersey, fifteenth to twenty-second; Alabama, sixteenth to twenty-first; Vermont, seventeenth to twenty-seventh; Mississippi, eighteenth and eighteenth; North Carolina, nineteenth and nineteenth; Maine, twentieth to twenty-fourth; Maryland, twenty-first to twenty-sixth; Massachusetts, twenty-second to twentieth; Connecticut, twenty-third to thirty-first; Minnesota, twenty-fourth to fourteenth; Arkansas, twenty-fifth to twenty-third; New Hampshire, twenty-sixth to thirty-second; South Carolina, twenty-seventh to twenty-ninth; Louisiana, twenty-eighth to thirtieth; *Kansas, twenty-ninth to seventeenth;* Florida, thirtieth to thirty-fourth; Nebraska, thirty-first to twenty-eighth; Delaware, thirty-second to thirty-fifth, Rhode Island, thirty-third to thirty-sixth. Thus it will be noted that the advance made by Kansas in the period named was beyond all question the most striking among all the States of the Union, ascending on an average to one place higher each year. Minnesota is the only State approaching her, but while she was doubling her aggregate of valuation Kansas trebled hers, and at the end had within four million dollars the valuation of Minnesota. New York, though leading in 1876 as in 1866, had $35,000,000 less valuation. Ohio losing $17,000,000 and Pennsylvania $8,000,000, Kansas had $30,000,000 in 1876 to $10,000,000 in 1868.

LOCATION OF BEST FARMING LANDS.

This question cannot be satisfactorily answered unless the exact wants of the interrogator are made known in each case. Only a very general answer can be given. There is probably no State in the Union where there is so small an acreage of waste land as in Kansas. The bottom-lands of our beautiful valleys are what are commonly known as "second bottoms," which very seldom contain ponds of stagnant water, and which are, in this respect, unlike most of the bottom-lands in most of the Western States. Skirting and distinctively bounding the valleys are picturesque bluffs, varying in form and size, sometimes gently undulating, and then bold and abrupt, and in most cases clad with verdure. Stretching out on either hand from the skirtings of the valleys are the gently-undulating prairies, or uplands, until other valleys are reached. Bottom-lands are preferable for hemp and tobacco, and are equally good for other crops, unless it be for fruit. It is thought by many fruit-growers that the growth in the bottoms is too rank and soft, and that the fruit is not as fair nor as highly flavored; others think this is compensated largely by the protection given from the high winds of the prairies. Sometimes wheat and other small grains grow so very rank in the valleys as to lodge badly, and wheat is a little more inclined to rust than on the high prairies. The whole State, including the yet unorganized counties, embracing what has been familiarly known as the "Plains of Kansas," is well adapted to stock-growing; this designation, which carries with it the idea of a country "without elevations or depressions," is as erroneous as that formerly applied, within our memory, to all Kansas—the "Great American Desert." While many watercourses have their source east of this region, a reference to the Kansas map will disclose the fact that the following rivers have their sources west of the State: the Cimarron River in the extreme south-west; the Arkansas some sixty-five miles north of the former; the Smoky Hill in the central portion; and the Republican in the north-west. It will also show that, as these rivers flow eastwardly, the feeders are numerous and important, webbing the unorganized counties with a network of watercourses which will enable sheep-husbandry and grazing of horses, cattle, and mules to be carried on to an unlimited extent. To rely upon this portion of the State, however, at the present time, for diversified farm industries would be disastrous—only a "potter's field" for all capital invested. The advantages for sheep-raising are equally as good until you reach the sixth principal meridian, and east of here through Kansas, in the ordinary method of keeping a limited number; but west of this line the range is unlimited, and the deep abrupt walls or bluffs in many localities, where small streams and ravines zigzag to the larger ones, guarantee ample protection from the severity of the winds of winter, and at the same time furnish, in the bottom of the miniature valleys and often on the sides of the bluffs, a good growth of wild grass which furnishes nutritious food. There are winters where stock, especially sheep, will go through with very little care or food beyond what has been named. The failures which have hitherto occurred in these industries in the extreme West are owing to the fact that an impression has gone abroad that because stock will occasionally stand this kind of treatment, it may be tried with impunity at any time. *This is an egregious mistake; stock any and everywhere in Kansas need more or less care, protection, food, and water*—more than they can obtain if allowed to roam at large. It is believed, however, that the mortality which often occurs is owing to *thirst;* streams become frozen, and the poor creatures become mad with thirst, and start out in all kinds of weather in quest of water, thereby exposing themselves to the inclemency of the weather when their systems are in the worst possible condition to repel cold, and when they would otherwise be huddled together behind Nature's wind-breaks and feeding upon native grasses, without "going out in the cold" for them.

There are two conditions precedent to a successful outcome in raising farm animals on a large scale. These are the adaptability of the climate and soil for the production of corn and the amount of grasses fit for pasture and hay. The figures in the progress of the corn-culture eloquently establish the claims of that cereal to the title of king of farm-products in Kansas. The extreme western organized counties are not as good for corn as those in the eastern part of the State, and it is questionable whether it can be grown with profit at all except in the river- and creek-bottoms. It can be brought by rail from eastern counties at less cost than it can be raised in the western, or stock can be taken farther east to winter. Corn last fall and through the winter has sold on the line of the railroad at from twenty-two to twenty-five cents. But stock can be driven a distance from railroad communication, where corn is cheaper. As to grasses, the unlimited pastures of Kansas produce a superabundance of the most nutritious wild or native varieties—the common prairie grasses in the east, and the buffalo and blue-stem in the west, taking the lead. As the buffaloes recede from the fast-encroaching settlements, the blue-stem, a variety which often grows from eight to ten feet high, reaches westward, and in turn will undoubtedly be followed by the smaller and more desirable prairie-grass, which obtains throughout all Eastern and Middle Kansas—that is, in the organized counties. Then, as the settlements become older and farms become fenced, timothy, clover, and blue-grass pastures and meadows have been established with ease, all taking kindly to the soil and promising the best of results. In the west—in fact, throughout Kansas—alfalfa promises to be eminently successful. Especially in the west, where rainfall is variable to some extent, and less than in the east, its determined, fibrous roots descend to a great depth, and it flourishes beyond all expectation. Millet and Hungarian also do well throughout the State. Spring wheat gives the best results in the north-west, but is being fast superseded by its stronger rival.

While we have not been sufficiently definite to answer any one particular question, we have endeavored to furnish a fair statement of the relative capabilities and possibilities of the different parts of the State, without narrowing down to county or district lines. In this connection we would be recreant to every sense of duty if we did not set forth a little more in detail the advantages and disadvantages of the eastern and western portions of the State.

PRICES OF IMPROVED AND UNIMPROVED FARMS.

The enthusiastic immigrant, when he leaves his more Eastern home, seeks cheap lands in the extreme West. He takes no more notice of the beautiful farms of Eastern Kansas and the improvements on every hand than if they did not exist. And yet these are among the most fertile and productive in the West. They have the advantage of having a most admirable network of railroads, which furnish convenient markets for their products; elegant school-houses and church edifices, dotting hills and valleys; modern bridges spanning the numerous streams; court-houses and other public buildings erected; fields under a high state of cultivation; orchards and vineyards in full bearing with all kinds of fruit grown in this latitude—apples, pears, peaches, apricots, nectarines, cherries, plums, grapes, together with the whole army of small fruits. To accomplish such results has required the pluck and energy of an enterprising people for the last twenty or more years. The transformation of the homestead region from a boundless prairie waste, beautiful but wild, into a land teeming with the foregoing evidences of wealth, prosperity, and civilization will require another twenty or more years. The western portion of the State is bewitchingly inviting to all of small means, whose only hope for a farm and home of their own is government land. It is equally so to those of larger means, who wish to prosecute farm industries on a large scale with the least possible outlay: especially is this true of stock-raising. But there is another class throughout the Eastern States, who possess from one to fifteen thousand dollars each, and whose little capital, owing to shrinkage in values, general business prostration, and want of confidence, is either idle or earning a very low rate of interest. These men are among the best, and are signalling the West for information to enable them to make safe investments in land and to establish new homes and business relations. In the East, with land from one to two hundred dollars per acre, their outlook is gloomy.

In Eastern Kansas we find an anomalous state of things—wild lands at about the same prices for which they can be had from private parties in the West, while improved farms can be purchased for less than the cost of the improvements; and this in a region unexcelled in fertility, with no parallel in the history of material development and substantial prosperity. It is no discredit to the country producing these apparent contradictions, but greatly in her favor. In the early settlement of the State, when immigration was exceedingly large, and when, as now, immigrants had to purchase largely the first year, the soil yielded so abundantly, and the market at each farmer's door for every bushel of grain, every pound of butter, every dozen of eggs, and everything else which he could produce, was so good, with prices so extraordinarily high, he considered it would be only a question of a few years when he would have all the surroundings that affluence could bring. Following quickly upon this glittering picture of future wealth, while land-speculation beset and upset even the old stagers who had passed through in the East the severe ordeal of 1836 to 1840, church-spires sprang up like magic, built with money largely sent by the various denominations in the older States; school districts vied with each other in the erection of elegant school-edifices; court-houses, bridges, and other public improvements were carried on; railroads were being pushed ahead with unexampled and unexpected celerity. The money for all these improvements was spent in the State, of which the farmers received a goodly share. This additional source of prosperity begat a new spirit of land-speculation, from which it was impossible for any class possessed of the ordinary frailties of human nature to escape. Farmers, being the most prosperous, outdid all others in the mania for land, which they purchased at fabulous prices, making small down-payments, giving notes for the balance secured by mortgage on all their real possessions.

While these seemingly inexhaustible sources of monetary supply continued, with real estate constantly appreciating, an Utopian future was presented to the mental vision. But in a day, as it were, all these cherished hopes were dissipated. Values depreciated; the various improvements herein named stopped; bonds which had been issued for railroads, expensive school-houses, bridges, court-houses, etc. called for a tax-levy for annual interest, and for a sinking fund for their final redemption; and interest had to be paid or defaulted on mortgages covering real estate largely undeveloped. Shrinkages occurred in everything except mortgages; these soon became malignant, cancerous growths, which not only consumed the profits of the farmers, but the farms themselves. Hence it is that a train of circumstances has conspired to bring financial disaster upon one class of farmers, while the prosperity of those who are out of debt, and the rapid advancement of the country in material greatness, clearly vindicate the statement that it is no fault of Kansas, of her soil or climate, that this state of things, nearly always incidental to the rapid settlement and development of a new country, exists. These overladen farmers, with pleasant surroundings, the accumulated labor of years, must give up their homes, save all they can, and commence anew in the West, where government lands can be had without price. It is to these farms, which can be had at great bargains, that the attention of the new-comer is called who has the means to gratify his inclination and taste.

POPULATION OF KANSAS.

THE following tables show the population of Kansas, by counties and principal cities, as returned by the assessors, through the county clerks, to the State Board of Agriculture, March 1, 1879:

POPULATION BY COUNTIES.

COUNTIES.	Enumeration of inhabitants, 1878.	Enumeration of inhabitants, 1879.	Incr.	Decr.	COUNTIES.	Enumeration of inhabitants, 1878.	Enumeration of inhabitants, 1879.	Incr.	Decr.
Allen	8,964	10,116	1,152		Marion	8,306	10,154	1,848	
Anderson	6,000	6,616	616		Marshall	12,270	17,129	4,859	
* Atchison	20,600	21,700	1,100		McPherson	11,291	13,196	1,905	
Barbour	1,388	2,016	628		Miami	14,433	15,161	728	
Barton	8,251	12,333	4,082		Mitchell	8,673	14,034	5,361	
Bourbon	17,741	18,310	569		Montgomery	16,468	15,979	...	489
Brown	10,446	10,790	344		Morris	5,656	7,197	1,541	
Butler	14,175	17,006	2,831		Nemaha	8,876	10,267	1,391	
Chautauqua	9,246	10,537	1,291		Neosho	11,055	13,594	2,539	
Chase	3,798	4,743	945		Norton	1,855	4,797	2,942	
Cherokee	17,770	18,535	765		Osage	12,618	15,369	2,751	
Clay	8,759	10,658	1,899		Osborne	6,125	9,445	3,320	
Cloud	10,163	12,636	2,473		Ottawa	6,664	8,757	2,093	
Coffey	8,599	10,077	1,478		Pawnee	6,114	7,023	909	
Cowley	15,390	18,157	2,767		Philips	5,436	7,956	2,520	
Crawford	12,759	14,622	1,863		Pottawatt'mie	11,196	13,791	2,595	
Davis	5,382	6,087	705		†Pratt (*a*)	...	2,084	2,084	
Dickinson	10,850	13,005	2,155		Reno	11,528	12,042	514	
Doniphan	15,122	15,459	337		Republic	10,132	12,193	2,061	
Douglas	18,931	20,530	1,599		Rice	6,149	7,501	1,352	
Edwards	1,700	2,801	1,101		‡ Riley	7,419	7,419		
Elk	8,218	8,787	569		Rooks	2,100	5,104	3,004	
Ellis	2,437	5,240	2,803		Rush	2,794	5,282	2,488	
Ellsworth	5,057	6,741	1,684		Russell	3,239	6,521	3,282	
Ford	2,160	2,832	672		Saline	9,530	12,424	2,894	
Franklin	12,381	14,073	1,692		Sedgwick	15,220	17,613	2,393	
Greenwood	7,638	8,202	564		Shawnee	19,114	22,632	3,518	
†Harper	...	2,158	2,158		Smith	8,315	11,498	3,183	
Harvey	8,107	10,440	2,333		† Stafford (*b*)	...	2,364	2,364	
†Hodgeman	...	1,738	1,738		Sumner	12,078	15,090	3,012	
Jackson	7,930	8,732	802		† Trego	...	2,310	2,310	
Jefferson	12,471	13,872	1,401		Wabaunsee	5,386	6,245	859	
Jewell	11,388	14,161	2,773		Washington	10,319	11,900	1,581	
Johnson	18,139	16,012	...	2,127	Wilson	11,760	11,901	141	
Kingman	...	2,509	2,509		Woodson	5,514	6,058	544	
Labette	17,196	18,171	975		Wyandotte	13,161	15,046	1,885	
Leavenworth	28,544	30,283	1,739		*Unorganized counties	8,500	15,000	6,500	
Lincoln	4,611	7,448	2,837						
Linn	13,228	14,586	1,358						
Lyon	13,634	15,073	1,439		Total	708,497	849,978	144,097	2,616

Actual increase during the year ending March 1, 1879, 141,481.

* Estimated by assessors.

† Harper organized August 5, 1878; Hodgeman organized March 29, 1879; Stafford organized June 30, 1879; Pratt organized July 25, 1879; Trego organized June 21, 1879—which accounts for no official returns for 1878.

‡ Returns for 1878; no enumeration for 1879.

(*a*) In 1878, Pratt county, then unorganized, was attached to Reno as a township thereof, and to which the enumeration was made. Population, March 1, 1878, 2180.

(*b*) At the time of the reinstatement of Stafford county by decision of the Supreme Court, June, 1879, Barton county extended to the south line of township 23. By said decision twelve townships were taken from the south part of Barton and added to Stafford. As the enumeration of inhabitants for Barton was taken March 1, 1879, the returns for said twelve townships appear in the Barton county returns, and show a population of 2367, or 197 to each of the Congressional townships. June, 1879, at time of said decision, the population of Stafford county was 4731. Deducting the population returned to Barton county (twelve townships), 2367, from that of Stafford county (4731), we have left 2364 for the remainder of the territory of Stafford county.

POPULATION OF THE PRINCIPAL CITIES, IN THE ORDER OF RANK, COMMENCING WITH THE HIGHEST.

Leavenworth, Leavenworth county	16,643
Topeka, Shawnee county	11,204
Atchison, Atchison county	11,000
Lawrence, Douglas county	8,478
Wichita, Sedgwick county	5,235
Fort Scott, Bourbon county	5,010
Wyandotte, Wyandotte county	4,612
Emporia, Lyon county	4,061
Ottawa, Franklin county	3,507
Salina, Saline county	3,383
Parsons, Labette county	3,130
Independence, Montgomery county	2,829
Newton, Harvey county	2,539
Junction City, Davis county	2,345
Olathe, Johnson county	2,260
Beloit, Mitchell county	2,194
Winfield, Cowley county	2,103
Osage City, Osage county	2,003
Paola, Miami county	1,973
Burlington, Coffey county	1,740
Hutchinson, Reno county	1,709
Clay Centre, Clay county	1,600
Manhattan, Riley county	1,593
Empire City, Cherokee county	1,591
Mound City, Linn county	1,497
Humboldt, Allen county	1,456
Concordia, Cloud county	1,441
Great Bend, Barton county	1,430
Marysville, Marshall county	1,420
Garnett, Anderson county	1,252
Osage Mission, Neosho county	1,216
Girard, Crawford county	1,184
Hiawatha, Brown county	1,078
Wamego, Pottawattamie county	1,071
Baxter Springs, Cherokee county	1,069
Minneapolis, Ottawa county	1,045
Holton, Jackson county	1,044
Seneca, Nemaha county	1,036
Larned, Pawnee county	1,031
Iola, Allen county	966
Eureka, Greenwood county	880
Oswego, Labette county	759
Chetopa, Labette county	745
Fredonia, Wilson county	720
Sabetha, Nemaha county	706
Neosho Falls, Woodson county	669
Washington, Washington county	656
Brookville, Saline county	485
Cottonwood Falls, Chase county	472
Louisville, Pottawattamie county	363

With few exceptions, throughout the State the same person performs the duty of assessor for his township and the city or town therein. We have given in the above list the population of the cities and towns of the State, so far as assessors made separate enumeration of township and city population. Where the population of township and city is aggregated, an *estimate* only of either could be given, and injustice might be done.

TEXAS.

AREA.

THIS State is bounded on the south-west by Mexico, from which it is separated by the Rio Grande, and on the east by Arkansas and Louisiana. It has an area of 237,504 square miles. The reader should remember that this vast region is equal in extent to all New England, together with New York, Pennsylvania, Ohio, and half of Indiana.

HISTORY.

In 1687, La Salle, the well-known French explorer, erected a fort on Matagorda Bay. In 1715 the country was settled by Spaniards, and several new missions were established, but the Camanche and Apache Indians, among the most warlike in America, and still troublesome to the border settlements, hindered the progress of the country. In 1803, Texas, claimed by both Spain and the United States, became a disputed territory. From 1806 to 1816 settlements were formed, and several attempts made to wrest the country from Spain. In one of these, in 1813, two thousand five hundred Americans and Mexicans were killed, among them seven hundred inhabitants of San Antonio. Mina, a Spanish refugee, gained some success, but was defeated and shot.

In 1819 the river Sabine was established as the boundary. In 1820, Moses Austin, an American, got a large grant of land in Texas from the Mexican government, and began a settlement which rapidly increased, but many of the settlers were of so lawless a character that in 1830 the government forbade any more Americans coming into Texas. In 1833 a convention of settlers, now twenty thousand in number, made an unsuccessful attempt to form an independent Mexican state, and in 1835 a provisional government was formed, Sam Houston chosen commander-in-chief, and the Mexicans driven out of Texas. Santa Anna, president of Mexico, invading the country with an army of seven thousand five hundred, after some successes was entirely routed at San Jacinto, April 21, and Texas became an independent republic, acknowledged in 1837 by the United States, and in 1840 by England, France, and Belgium. In December, 1845, Texas, at her own request, was annexed to the United States, but was invaded by Mexico, which had never acknowledged its independence, and thus originated the war with the United States.

PHYSICAL FEATURES.

The country near the Gulf is level, with a gradual ascent toward the north. The coast-region is formed of alluvial beds of sand or gravel. The whole of Eastern Texas, embracing a territory larger than Ohio, consists of pine-barrens, called "cross timbers," interspersed with prairies which give it a park-like and delightful aspect. The little arable land of Eastern Texas is confined to the valleys of the streams. Out of the valleys the soil is sandy, and would not pay to clear and cultivate. This region, it would seem, is not destined to become thickly peopled. It now supports a scanty population of lumbermen, and some poor farmers who cultivate little patches along the creek-bottoms.

The larger streams are bordered by narrow tracts of good soil, where there are some large cotton-plantations. This part of the State is not a new country, and except on the opening of the lumber industry by the building of a railroad it has had no growth in recent years. Something might be done with fruit-culture; a few peach-orchards at Palestine have proved remarkably profitable, their product bringing an extremely high price in the St. Louis market; but the population lacks enterprise to develop any new branch of industry. The middle region of Texas, or that portion lying west of the above-described pine-barrens, stretching from the Red River southward almost to the Gulf, and having an average width of about two hundred miles, consists of beautiful rolling prairies, which are unexcelled in fertility and productiveness. This region may be roughly compared in area to the State of Illinois.

Farther west is a broad belt of hilly or rolling country, consisting of prairies and post-oak or black-jack openings, that is too dry for agriculture, but is well adapted to grazing. This is the great cattle-region of Texas. It stretches from the Red River to the Rio Grande and the Gulf. Some portions of this region may eventually be cultivated if the rainfall, which is now insufficient, should increase by climatic changes, which are said to be going on along the eastern border of the whole arid region from Montana down to Mexico.

Still farther west is an immense arid region, comprising about threefifths of the whole surface of the State. This region is in the nature of a high table-land, and the salt and "Staked Plains" (so called from the great abundance of yucca-stems, resembling stakes), elevated from three to four thousand feet above the sea, without trees or grass, destitute of vegetation, may be allied to a vast desert. There are a few small mountains in the west, spurs of the Rocky Mountains. The river-bottoms are well timbered.

CLIMATE.

The climate of Texas is variable, from semi-tropical to moderately temperate. Snow and ice are seldom seen in the central portion, and rarely if ever in the extreme south. In the northern part one or two snowfalls during the winter, of from one to three inches in depth, are usually expected; occasionally a much heavier fall of snow is had, and ice from one to two inches in thickness is sometimes made. The mercury rarely falls more than three or four degrees below the freezing-point, and seldom continues that low more than two or three days at a time. Stock graze all winter; field-work can be done at all seasons of the year; and February is regarded as the time for planting corn and other cereals. The extreme heat of the summer is 90° to 95°, rarely rising to 100°, while in some of the Northern States in the latitude of St. Louis it not unfrequently rises to 104°, and even higher. The summer heat is so tempered by cool and refreshing breezes from the sea-coast and the light winds which blow almost continually from the south and west as to render it far less oppressive than in the Northern States. The nights are delightfully cool and pleasant. Sunstroke, so frequent at the North and East, is almost unknown here.

MINERALS.

In this State are found fine marbles and some deposits of lead and copper.

AGRICULTURAL PRODUCTS.

The soil is of great fertility, the coast producing the finest cotton and sugar, and the interior wheat, corn, and fruits of all kinds, with immense pasturage, making it one of the finest cattle-raising countries in the world.

Central Texas is probably the best cotton country in the South, and is now producing one-sixth of the whole cotton crop of the United States. It is not nearly as good a corn country as Illinois and Kentucky, and for the production of wheat no part of it can compare with Minnesota, Iowa, and Kansas. Root-crops, as a rule, do not succeed; the product, though large and apparently well developed, is coarse and watery. Some fruits do tolerably well, particularly the peach and pear, but little attention is given to raising them. Apples are brought from the North. Central Texas is declared to be a paradise, with excellent soil, and a climate which brings visitors for profit, pleasure, and health from all parts of the world. Stock-raising, for which Texas is especially adapted, yields to the diligent herdsman a bounteous remuneration for his services. The vegetation is in the greatest variety, from the oak, cedar, and pine to the palmetto, mezquite, and nopal, which latter feeds the cochineal insect; also figs, oranges, grapes, vanilla, and flowers in wonderful profusion.

ANIMALS.

The prairies abound in buffalo and immense herds of wild horses, and the forests with deer. There are also the puma, jaguar, black bear, and the wolf.

MISCELLANEOUS.

The State deaf and dumb, orphan, blind, and lunatic asylums have each an endowment of 100,000 acres of State lands. There is a State school fund of $2,500,000, and each county has 17,712 acres of land for educational purposes. The tide of immigration into the State is immense, and there is every prospect that during the present year it will be very large. The taxable property of the State in 1850 was $51,000,000; in 1860, $294,000,000; in 1870, $174,000,000; in 1875, $275,000,000; while it is believed that in 1879 the figures reached will be nearly $325,000,000.

Though the country is generally level, it is not destitute of wild and grand scenery. In some parts of the State are found gigantic animal fossils and silicified trees, which are objects of wonder and admiration to the scientist and antiquarian.

Austin, the capital, is a thriving town. The metropolis and most important seaport in the State is Galveston. Other towns of importance are Houston, Marshall, Indianola, and Corpus Christi.

IDAHO.

BY WILLIAM P. CHANDLER, SURVEYOR-GENERAL.

THERE is a succession of mountains extending over a large part of the northern half of this Territory, the soil of which is generally sandy and rocky. The mountain-sides are covered with pine, fir, and cedar timber. In the southern part the Goose Creek and Owyhee ranges extend to the southern and western boundaries, with similar soil and a growth of juniper timber.

The soil of the lower hills is composed largely of decomposed granite and sandstone, and in its natural state produces a luxuriant growth of bunch-grass, affording abundant grazing for stock.

The soil of the table-lands is much the same, except considerable tracts in which fine rich loam is intermixed, and when irrigated produces large crops of grain. Sage-brush grows on all the table-lands interspersed with grass. In the valleys of the streams and along the bases of many of the mountain-ranges the soil is a dark, sandy loam, finely pulverized, and mellow and well adapted to the growth of cereals and vegetables.

There is a large volcanic plateau near the centre of the southern half of the Territory, inaccessible and unexplored, destitute of soil or vegetation.

CLIMATE.

This Territory, extending from the 42d degree of north latitude to the 49th, and its surface broken up into undulating plains, high rolling hills, and rugged mountain-ranges, has a varied climate. The valleys are mild and equable, sufficiently warm in summer to mature the crops of the farmer, and rarely visited by severe storms or deep snows in winter. In the high and mountainous regions the winters are long, deep snows cover the ground, but owing to the purity and dryness of the atmosphere they are endured without great discomfort. The dry, cool air of the mountains, the pure streams of cold water, the game for the hunter and trout for the angler, render life in the mountain-region in summer a perpetual attraction to the tourist and invalid.

The temperature of Boise City, the capital, in latitude 43° 37′ north and longitude 116° 12′ west, 2880 feet above sea-level, is mild, the lowest point during the winter of 1878–79 being 5° above zero in January, and the highest, 103°, August 9.

The rainfall was as follows:

Seasons.	Inches.
Autumn, 1878	1.10
Winter, 1878–79	5.37
Spring, 1879	4.38
Summer, 1879	1.46
Total	12.31

AGRICULTURE.

In considering the agricultural resources and productions of Idaho reference must be made to its altitude and surface.

Its elevation is from two thousand feet above sea-level, in the lower Snake River Valley, to nine thousand feet on the top of its mountain-peaks, a large part lying above the altitude of four thousand feet.

The higher portions are broken up into a succession of mountain-ranges, in many places very steep and rugged. Below these are high, rolling hills, upon which nutritious grasses are found, affording vast pasture-lands for stock. Still lower are the table- or "sage-brush" lands, rich in soil, and when properly irrigated and cultivated producing large crops of cereals and vegetables, and favorable to the growth of fruits common to this latitude. The valleys of the streams are fertile, and in the northern portion of the Territory (where the rainfalls are sufficient in spring and early summer) excellent crops of cereals are raised without artificial irrigation. In the central and southern parts irrigation is essential to sure and good crops, although there are occasional small tracts lying near the level of the streams on which grain-crops may do well without.

The mountain-valleys and plateaus, lying not to exceed five thousand feet above sea-level, produce large crops of oats and the hardier vegetables, and yield hay abundantly when sufficiently watered.

The agricultural lands are found along the valleys, and include the table-lands lying lower than the sources of the streams flowing through them, from which water can be brought for irrigation.

The aggregate amount of such land is large, but is distributed in comparatively small tracts throughout the whole Territory wherever there are streams of running water, but mostly in the northern and southern portions. In the northern, along the valleys of the Spokane, Palouse, and Clearwater Rivers and their tributaries, successful and quite extensive farming is carried on, the surplus products finding a ready market down the Snake and Columbia Rivers, which are navigable to Lewiston, the county-seat of Nez Percé county.

Salmon River, south of the Clearwater, is a large and rapid stream. Its source is in the western slope of the Rocky Mountains and along the Saw-Tooth Range near the centre of the Territory, and it courses through its entire breadth from east to west, and unites with the Snake near latitude 46° north. This stream rises in and runs through the most rugged and mountainous part of the Territory, with but little agricultural land along its narrow valley. Bonanza City, in latitude 44° 35′ north, longitude 114° 30′ west, altitude sixty-four hundred feet, is situated on its head-waters, and is surrounded by high and rugged mountains whose peaks tower into the regions of perpetual snow.

A large area of the interior of the Territory is covered by mountains, which extend across it from the Rocky Mountain range on the eastern boundary to the Snake River on the western. Weiser and Payette Rivers rise in the westerly spurs of this mountain-range, and flow westerly into Snake River near latitude 44° north, the valleys of which contain many acres of very fertile land, upon which there are good farms; and many more will be taken up and cultivated when the settler can feel assured that he will not be exposed to the annual raids of marauding Indians.

Boise River takes its rise in the south-easterly spurs of the same mountain-range, flows north-westwardly, and joins the Snake in latitude 43° 40′ north, longitude 117° west. The valley of this stream, for a distance of sixty miles from its confluence with Snake River to where it debouches from the mountains, contains a large area of the most productive land, the valley being at some points several miles in width, with many farms in a high state of cultivation. The stream falls in its course through the valley at the rate of about ten feet per mile. The banks are low, and water is easily diverted from its channel to irrigating-ditches.

Snake River takes its rise in the mountainous regions of Wyoming, and its various branches, flowing westwardly into the Territory, unite in one grand stream twenty-five miles north of Taylor's Bridge, about fifty miles from the east boundary of Idaho. Thence its course for a distance of one hundred and sixty miles is to the south-west; thence north-westwardly about the same distance to the western boundary of the Territory;

thence north along the western boundary about three hundred and fifty miles to Lewiston, where it passes into Washington Territory. At the point of junction of the several streams forming the Snake there is a large tract of rich bottom-land, mostly above high water, and to which many settlers have removed this season, feeling confident they will succeed in their efforts to cultivate successfully this valley, although the altitude is nearly five thousand feet above sea-level.

The stream from this point for a distance of one hundred and fifty miles runs through a broad valley of rich land. In many places the banks are low and favorable to the construction of irrigating-ditches. Below this point for seventy-five miles the river courses through a deep rocky cañon, in which is situated the Shoshone Falls, equal to the Falls of Niagara in height and volume of water and far exceeding them in natural scenery. After leaving the cañon the river flows with a gentle current through an open rolling country about two hundred miles, when the mountains on both sides close in, and its course is confined to a narrow rocky channel or cañon until it leaves the Territory near Lewiston.

The valley of Snake River contains most of the table-lands in the Territory, and the water of the stream is ample for irrigating millions of acres of as productive land as can be found in any country.

Running into the Snake from the south are several small streams, the valleys of which contain considerable tracts of agricultural lands. Commencing with the Bruneau, thence following up the stream, are Goose and Marsh Creeks, Raft River, Fall, Rock, and Bannock Creeks, Portneuf, Ross's Fork, and Blackfoot Rivers. There are settlements in the valleys of all these streams, but the more considerable are along Goose and Marsh Creeks, Raft River and its tributaries, and Blackfoot.

In the south-eastern portion of the Territory, along the Malad and Bear Rivers and their branches, are large settlements of prosperous farmers.

I have only called attention to the most important agricultural sections of the Territory, leaving out the many small valleys containing small areas of very productive land and more or less occupied by the farmer and herder.

Any estimate of the number of acres of the various classes of lands in this Territory, so broken in its surface and varied in its climate and altitude, can be only approximate. Of its total area of 55,228,160 acres, I believe 12,000,000 acres to be agricultural, either in its natural state or as it may be reclaimed by irrigation with the available water now flowing in the streams; 25,000,000 acres pasture-lands; 10,000,000 acres timber-land; and the remainder, 8,228,160 acres, may be considered worthless, consisting of inaccessible mountain-peaks and lava-beds.

The development of the agricultural interests of the Territory has been slow, owing to its inland and isolated position, lying outside of all railroad lines until the building of the Utah and Northern Railroad through the eastern part during last year, with no navigable waters except at Lewiston, at the head of steamboat navigation on Snake River, just as it leaves the Territory. Transportation by teams is so expensive that but little profitable farming can be done beyond a supply of the home market, which is found at the mining camps principally, where remunerative prices are obtained.

The yield of cereals is large; twenty-five to forty bushels of wheat and barley, and fifty to eighty bushels of oats, per acre, is a fair average yield. Where the ground is properly irrigated and cultivated failure of crops has never been known. All the vegetables grown in this latitude are produced in abundant quantities for the wants of the people. Loss of crops at harvest-time, caused by rains, is unknown.

I have been unable to find any statistics showing the number of acres in cultivation, number of cattle, horses, etc.; but through the kindness of Joseph Perault, Esq., Territorial Auditor, have been furnished with the total assessed value of property for taxation, as follows:

1877	$4,319,958.75
1878	4,520,800.50

The present year has been a prosperous one for the farmer, large crops of all kinds having been raised.

MINING.

The mineral wealth of Idaho is its largest resource. Extensive and rich lodes of gold-, silver-, and copper-bearing ores are known to exist in various parts of the Territory. The production of the precious metals is the most important and leading branch of industry. The field for enterprise in this direction is almost without limit, but the development of its mines has been retarded by the high price of labor and the great cost of transporting supplies and machinery to the centre of the mountainous regions in which the mines are mostly situated.

The building of the Utah and Northern Railroad through its eastern border, and the expectation of the early construction of a line from near Blackfoot to the Columbia River, running through the centre of the Territory, has stimulated prospecting, and many rich lodes of gold- and silver-bearing ores have been discovered within the year.

Placer-mining is carried on successfully in many places, but the yearly exhaustion of surface-diggings reduces the annual production from that source.

Gold too fine to be separated from the earth by the old process of washing is found in Snake River Valley through its whole distance in the Territory, and heretofore it has baffled the skill of the miner to save it. During the present season several parties have been working claims along the river with silver electro-plated machines with satisfactory results. Should this system of mining prove successful, it will open up a large field of operations. The area of land containing this fine or "float" gold may be counted by thousands of acres.

I have no means of ascertaining the annual production of the various mines in this Territory, but from the printed statement of Wells, Fargo & Co. find the total shipments of gold-dust, bullion, and ore for the year 1878 to be $1,868,122.

To obtain information regarding the condition of mining interests, I addressed letters of inquiry to several United States deputy mineral surveyors, requesting statements of the development and production of the mines in their localities. I also requested A. Walters, Esq., United States Assayer at Boise City, to furnish a brief outline of the mineral resources of the Territory. His official relation with miners gives him facilities to obtain the most reliable information, which is contained in his able and intelligent statement, and which I have the pleasure to introduce:

"UNITED STATES ASSAY OFFICE,
"BOISE CITY, IDAHO, October 3, 1879.

"SIR: Agreeably to request, I have the honor to herewith give you a brief outline of the mineral resources of Idaho Territory and the past and prospective production of her mines.

"Until five or six years ago by far the largest portion of the precious metals produced in the Territory was derived from the placer-mines, and it is safe to credit to that source of supply at least three-fourths of the sixty-five millions produced up to 1873. Since then most of the rich alluvial deposits have been exhausted, and, with few exceptions, placer-mining is entirely in the hands of Chinese, who, on account of their more than frugal habits and mode of living, manage to realize (to them) large profits from claims which would not yield the lowest wages to a white laborer. While during the most productive seasons these placers yielded as high as five and six millions per annum, less than one million has been taken out annually for the last few years, principally derived from the placers of Boise Basin. There being a large amount of poor—or so-called Chinese—diggings, this production will probably continue for quite a number of years, but as the whole country has been pretty thoroughly prospected for placers, it is hardly probable that any more rich diggings will be found that are extensive enough to cut a figure in the bullion production of the Territory.

"The gradual exhaustion of the placers naturally led miners to look for the source whence these gravel-deposits came, and numerous gold- and silver-bearing veins were thereby discovered, especially during the last three years.

"The first lodes discovered were those of Owyhee county, the Atlanta and others in Alturas, and the Gold Hill in Boise county; but, though great excitement was created for a while by the enormously rich and extensive silver-lodes found in the former, reckless mismanagement and the working of the mines in the interest of stock manipulations, coupled with the high price of machinery and rate of wages, soon resulted in the same disastrous consequences experienced to a greater or less extent by all the Pacific coast mining States and Territories in their earlier history.

"The revival of quartz-mining dates from the successful operations of the Gold Hill Mining Company, which, through good and economical management, succeeded in realizing large profits from ore which, I believe, on an average yields less than ten dollars per ton. Since that time many of the old Alturas and Owyhee mines have come to the front again, new ones have been steadily discovered, and for several years the lode-mining interest has decidedly overbalanced that of placer-mining.

"The largest amount of bullion has undoubtedly been produced by the Owyhee mines, and the fact that they have been comparatively idle since 1876 is almost exclusively due to the almost simultaneous absconding of the secretaries of the Mahogany, Ida Elmore, and Poorman companies with all their available funds, and the suspension of the Bank of California, aggravated by the fact that nearly all the incorporated companies worked their mines for the sole purpose of bulling and bearing stocks in San Francisco. The latter is also the cause of the sudden collapse of one of the best base-metal camps of the coast, South Mountain. In that district are found numerous veins of argentiferous galena, the finest carbonates, unusually rich in silver, good iron ore for fluxing—in short, everything necessary to make the camps flourishing and prosperous—but, nevertheless, bad management succeeded in ruining the camp, and nothing has been done until this summer.

"The mines of Alturas county have not produced as much this year as before, a large number of her miners having left to prospect in Lemhi county, where remarkably rich and extensive veins have been discovered during the last few years.

"The lodes of Rocky Bar district are exceptionally rich, but narrow, varying generally from three to six feet in width, and the miners are laboring under great disadvantage in not having a good quartz-mill which will work their ores cheaply and to the best advantage. The Atlanta mines have been doing well, and the discoveries in Queen's River and Lake districts, and those on Wood River, will undoubtedly materially increase the production of the county next year.

"Great excitement has been and still is prevailing about the discovery of remarkably rich lodes in the Yankee Fork district, Lemhi county. The veins in that camp are of an unusual width and richness, but so far the production has been small, as the absence of a wagon-road made it impossible to bring in heavy milling machinery, and outside of the richest ores, shipped principally to Salt Lake City for reduction, the working of ore has been carried on only in the two arrastras of Mr. Norton, owner of the Charles Dickens lode. A few weeks ago a wagon-road was completed, and next year at least one good mill will be erected; and as there is an enormous amount of ore in sight, Lemhi county mines will probably furnish the largest amount of precious metals during the next few years.

"In Boise county, the Elmira Company, working the Wolverine, Crown Point, and Banner lodes in Banner district, has been steadily at work, taking out a large amount of silver, and, with some needed improvements in their reduction-works, they will be large producers next year. The Gold Hill Mining Company of Quartzburg has also, as usual, been working their mill to its utmost capacity, and some of the late discoveries on Cañon Creek, near Placerville, have produced some very rich ore. In the southern part of the county, eight to twelve miles from Boise City, quite a number of gold-bearing quartz-lodes have been discovered during the last year. So far, operations have been in most cases confined to prospecting and dead work, and as the ore is not very rich it requires the erection of a good mill, like that of the Gold Hill Company, to ensure profitable working of the same.

"Northern Idaho, especially Idaho county, possesses a large number of gold- and silver-bearing veins, but there are no mills to work the ore, and not even a wagon-road to bring in machinery, and consequently they all lie idle; the owners, being poor men, are unable to work and develop lodes without a market for their ore.

"In Ada county several veins carrying exceedingly rich copper have been found, and some work done on them this year. There are also good silver- and galena-lodes in Mineral district, but little work has been done so far on account of the isolated situation of the camp.

"It is impossible to furnish approximately correct data of the bullion production of all these mines, many of the owners refusing to give any information, but I think it perfectly safe to place it at not less than a million dollars. This looks little, but lode-mining in this Territory is still in its infancy, and surrounded by difficulties and drawbacks experienced in no other State or Territory, except perhaps Arizona. We have no railroad communication so far, many mining districts being even without a wagon-road, and consequently wages are high. Mining and milling machinery costs here two and three times as much as in more favored localities, and its absence in many districts makes the working of the mines beyond mere annual representation an impossibility for the poor owners; but as it seems now to be a finally settled fact that the Utah Northern Railroad will traverse the Territory in close proximity to the principal mining districts, there is no doubt in my mind that the mines of Idaho in the course of a few years after the completion of this railroad will give her one of the leading positions among the bullion-producing States and Territories of the Union.

"I have the honor to be, very respectfully,

"A. WALTERS, *United States Assayer.*

"Hon. WM. P. CHANDLER, *Surveyor-General of Idaho.*"

The following items respecting the development of the mines in the Yankee Fork mining district have been kindly furnished at my solicitation by Walter S. Shannon, Esq., United States deputy mineral surveyor and mining engineer, which I beg leave to present:

The mines of Yankee Fork are principally gold-bearing quartz. The working of these did not commence until early last spring. Morrison's placer has been worked for some years with great success; nuggets have frequently been found as large as hens' eggs. Over thirty-five thousand dollars have been expended during the last four years in constructing ditches, dams, etc. At present it is paying $1.25 per pan. This placer-mine is situated at the mouth of Jordan Creek, which empties into Yankee Fork River.

The Custer mine is situated on the side of Mount Custer, nineteen hundred feet above Yankee Fork River and three miles north-east of Bonanza City. The ledge is between three and four hundred feet wide, and runs from top to bottom of the mountain, the ore assaying from $450 to $650 per ton. The owners, Messrs. Heggin, Tevis, Hurst, and Pfieffer (Pfieffer superintendent), are working the mine, running a tunnel, so that the miners will be protected from snow in winter. A forty-stamp mill is in process of construction in San Francisco, which will be placed in position early the following spring.

The Unknown mine, owned by the same parties, including Mr. George Grayson, is situated on the east side of the Custer mine, and is a continuation of the Custer ledge, but containing rock which assays from $900 to $1000 per ton.

There are other mines situated on Mount Custer, but of a lower grade.

Mount Estis mines, which are seven miles north-west of Bonanza City, are of a different formation from the Custer rock, being less flinty.

The Montana mine is the principal one, owned by Captain Varney, who has a tunnel fifty feet from the surface. This rock assays from $6000 to $7000 per ton, all free gold. The ledge between hanging-wall and foot-wall is eight feet. The captain has been shipping rock to the quartz-mill at Atlanta during the past summer.

Estis mine, owned by Estis Bros., is situated near the Montana mine, and is estimated at the same value. The ledge is seven feet wide. Their rock at present is worked by an arrastra.

Charles Dickens mine is situated on the forks of Jordan Creek and Yankee Fork River, on the east side of the hill, four hundred feet above the river. The tunnel follows the ledge sixty feet. The rock assays between $300 and $400 per ton. They have an arrastra, which is worked night and day. This mine is owned by William Norton, Esq. The rock from these mines, excepting the Montana and Estis, is roasting ore.

As soon as stamp-mills are erected the owners of mines will commence work in earnest. At present the number of miners employed does not exceed three hundred, who command five dollars per day. The seasons are very short for mining purposes, and the want of a wagon-road has retarded the development of the mines.

The Wood River district is situated south-easterly from Bonanza City, about sixty-five miles. The hills around the head of Wood River are a spur of Saw-Tooth range. The principal mines are situated at the head of Wood River, better known as "Ketchem's Camp." The character is chloride, and consists principally of silver and galena. All the rock from this district carries seventy-three per cent. of galena, and no mine

SHOSHONE FALLS.

assays less than $165 per ton of silver. Gold is very seldom found. The principal mines are the White Cloud, Pilgrim, Shamrock, Quimby, and Occident, which all assay more than $200 per ton, and as high as $900. Messrs. Ketchem & Shannon intend to put up a smelter early next spring. The altitude of this district is eight thousand four hundred feet above sea-level. A wagon-road is to be built next spring to the emigrant wagon-road, which is twenty miles south of Ketchem's Camp.

Major Robert M. McDowell, United States deputy mineral surveyor and mining engineer of Banner district, in response to my request, furnishes the following statement relating to the mining interests in that and adjoining districts:

The placer-grounds at Idaho City, and in the cañons leading thereto, for a radius of fifteen miles, as a matter of history have been among the richest in the world. These are flanked by rich deposits of gold-rock in the Quartzburg district, where shafts have been sunk on the trend of the lode, one to the depth of seven hundred feet from the surface and two hundred and fifty feet below water-level, which is a greater depth than has been attained by any similar work north of Snake River. A number of valuable gold-mines, mostly operated by adits and tunnels (with quartz-mills), are located in the above last-named district and Summit Flats, and all are yielding profitably. The character of this quartz-carrying sulphuret is free, and milling and reduction "kind" and inexpensive, costing only from $5 to $6 per ton and yielding from $8 to $100 per ton. The deposits of pay ore, though located mainly in chimneys (ledge-matter), are nevertheless easily traced, in most instances being confined between walls of granite and gangue. Sometimes their courses are intercepted by porphyry-dikes. Of the mines in successful operation are Gold Hill, Sub Rosa, Ebenezer, and Balshaza.

During the present year a rich gold-lode has been discovered on Moore's Creek Summit, eighteen miles eastwardly from Idaho City. A clean-up of fifteen tons gave a result of $110 per ton.

Some eighty miles from Idaho City the great Saw-Tooth range, running in a north-east and south-west course, towering far above lesser elevations called mountains, and having an approximate altitude of nine thousand feet above sea-level, with its imbedded strata of silver and gold quartz, invites labor and capital. Indians have prevented advances in that direction this season, but next year rich discoveries are anticipated.

Banner district, Boise county, twenty-eight miles from Idaho City, north-east, in latitude 44° 30′, is essentially a silver-mining region, and rapidly developing as such. In 1875 a twenty-stamp dry-crushing quartz-mill, roasting-furnace, shop, assay-office, etc. were erected, but owing to a deficiency in the skill of properly chloridizing the ore, and from other causes, no successful progress was made until within the past year, when it was purchased by the Elmira Silver Mining Company, capitalists from Elmira, New York. The production has been 3900 pounds of silver bullion, assaying 920 fine, from the 1st day of July last to the 1st day of October. About fifty men are employed in all departments, and the average yield of ore mined is from $75 to $85 per ton, by milling process. The absence of bases in these ores is notable, as shown by the following analysis:

Silica (quartz)	92.4
Sulphur	1.0
Iron	6.0
Arsenic	0.6
Zinc traces	0.0
	100.

Banner district yields chlorides (black sulphurets rarely), antimonial, arsenic, ruby, and native silver. The general direction of all the ledges thus far prospected or developed is north-east and south-west. Identification is not easy, as the ledges do not often outcrop upon the surface; yet the silver-belt has been traced some ten miles, and has a width of less than a half mile.

Some fifty claims are located, and while by assays some specimens have shown as high as $6000 and upward, from $50 to $100 is probably near the figure to be relied upon in actual milling process on chlorination up among the nineties.

The veins do not seem to be continuous, but in pockets or chimneys, and are encased within granite and gangue of a white or light-yellow tinge, and are almost invariably accompanied with manganese, which assumes the thickness of half an inch to two inches, and is always indicative of a well-defined paying ledge. The ledges in this locality have not been sunk upon to sufficient depth to ascertain trend and dip as a general rule. Veins located on parallel ridges having the same course dip toward each other, and it is contended by miners and experts that each vein will preserve its identity to an inexhaustible depth. Many theories are advanced, but only actual sinking can demonstrate their nature.

The Elmira Silver Mining Company have possessory titles to upward of twenty lodes, but are prosecuting work upon only three of the number —viz. Crown Point, Wolverine, and Banner. The first-named two have been entered by three shafts and two tunnels, and a well-defined vein averaging two feet in thickness (milling $85 per ton) developed from the surface-croppings down to a depth of two hundred feet.

POPULATION.

The isolated and inland situation of Idaho and the want of easy communication to its borders have prevented any rapid increase in population.

Since the Territorial organization only the census of 1870 has been taken. The number shown by that enumeration was 20,588. Since that time there has been a steady and healthy growth, and the number may now reasonably be estimated at 27,000.

TRANSPORTATION.

Lying outside of all the great routes of travel and commerce, the only means of communication hitherto has been by tedious and toilsome journeys over unimproved roads, except the outlet by Snake and Columbia Rivers—navigable for light-draught steamboats—to one point in Northern Idaho for a few months in each year.

During the past and present year the Utah and Northern Railroad has been constructed from Franklin, at the southern boundary of the Territory, through its eastern border, a distance of one hundred and fifty miles to Camas Station, its present terminus. This road will be extended to Montana at an early day. Surveys have been made during the present season for a line to the Columbia River *vid* Boise City, to connect with this road at or near Blackfoot Station.

Freights are high and commercial intercourse restricted. Rates from Kelton—on the Central Pacific Railroad, the nearest railroad point—are from three to five dollars per hundredweight to Boise City, and much more to most of the mining camps.

The mountain-formation extending across the Territory near latitude 44° north divides it into two parts as regards communication. There are no roads in the Territory connecting its northern and southern portions, and it seems to be an undertaking too expensive for the local authorities to build a wagon-road through this region, although the physical obstacles are not great.

STOCK-GROWING.

This interest is large and constantly increasing. The facilities afforded by pasture-ranges, covered with a luxuriant growth of bunch and other grasses indigenous to this soil and climate, limited only by accessibility to watering-places, early attracted the attention of the herdsman. Cattle and horses in numerous and extensive herds subsist the whole year through on these natural grasses, supplemented in winter by white sage, sweet and nutritious after being touched by the frosts of autumn.

The herds are usually driven to the hills and mountain-slopes during summer, reserving the feed along the foot-hills and valleys, where but little snow falls and the temperature is moderate, for winter. Most stock-growers find their winter range near natural meadow-lands, where hay enough is secured to feed through the exceptional seasons when deep snows cover the ground. These winters are liable to occur once in from four to six years.

The beef produced is of an excellent quality, and stall-feeding never resorted to.

There being no statistics of stock made in the Territory, I will not attempt to state the number owned and herded within its bounds. It is estimated that twenty thousand cattle have been sold for the Eastern markets this season from the western part of the Territory, and probably an equal or greater number from the northern and eastern portions.

Wool-growing has not yet received much attention, although the soil and climate are well adapted to that interest. There are several flocks of sheep owned in the Territory, but the number is not large.

Horses enough are raised to supply the increasing wants of the people.

The profits to the careful and judicious stock-grower are large, and stated by one in the business to be not less than thirty-three and a third per cent. per annum on the capital invested.

RESOURCES.

The geographical position of Idaho is such that the various branches of industry depend more largely upon each other than in most States. Lying outside and beyond the main thoroughfares of commerce and travel, the surface broken into many high mountain-ranges, traversed by numerous rapid streams flowing in deep valleys, thus making the construction of roads costly and difficult, communication has been slow and tedious, and each settlement almost a community by itself and depending upon itself.

The discovery of gold along the valleys of the streams first brought the miner, whose wants were supplied by pack-trains, bringing the barest necessaries of life at fabulous prices to the mining camps situated in its mountain-fastnesses. Following, came the agriculturist, seeking out the nearest arable valley to raise such vegetables as were indispensable to the miner; and gradually, as the mining interest increased and spread over the various parts of the Territory where the precious metals were found, so gradually grew the agricultural interest to supply the local demand only, followed by the mercantile to supply both, thus making all to hinge upon the mining interest. As it was at the early settlement of the Territory, so it is in a great measure now.

Manufacturing, which might reasonably have been expected to follow, has not; one of the reasons for which may be the high price of labor, mechanics commanding from four to eight dollars per day. Another may be found in the fact that there is no centre of trade or commerce for any considerable portion of the Territory, each community or settlement supplying itself from the nearest business-point, either within or without the Territory as most convenient.

Flour-mills sufficient to manufacture flour for local demands are established at various points, and also saw-mills to cut the lumber required for home use by the settler.

Near Boise City three considerable irrigating-ditches have been constructed, for which water is taken from Boise River and distributed over nearly sixty thousand acres of most productive land, which without irrigation was barren and worthless. Many other ditches have been constructed and large quantities of land reclaimed, but mostly by each farmer for his own use. No systematic and organized effort has yet been made for the construction of large and expensive ditches to reclaim the thousands of acres lying along the valleys of the streams, that need only the fertilizing touch of water to make that which is now an arid desert laugh with bounteous harvests.

The subject of irrigation and the reclamation of the irrigable lands in this Territory is one of vast importance to its future growth and prosperity, and seems worthy the early attention of the government. There are yet small tracts of vacant land lying along the smaller streams that are available for the settler of small means, and the present laws for their disposal appear applicable; but there are large plateaus of irrigable land lying in Snake River Valley that will require a larger capital to reclaim than private parties under the present land laws will care to invest. Either large tracts should be sold to parties who would construct and maintain ditches, and depend upon the sale of the lands for their remuneration, or some general system should be adopted by the government, and the construction carried on by it as the needs of the country require. The land classed as grazing- or pasture-land is worthless for any other purpose, and unsurveyed, and if ever disposed of must be in extensive tracts.

Much of the timber used for fuel is found along the borders of the streams, and consists principally of cottonwood, poplar, and willow, is taken from land owned by the parties using it, and is very limited in quantity. The fir and pine timber, valuable for building and commerce, grows on the mountain-land, and much of it is found on steep, craggy hillsides and in inaccessible mountain-valleys, and is so difficult of access and so distant from the farm-lands that no more is cut than the actual necessities of the settlers require. During the summer fires rage over extensive tracts, destroying immense quantities.

The material advance of Idaho is not rapid, but steady and continuous. The advantages from the building of the Utah and Northern Railroad on its eastern border are already seen in the settlement of large tracts of land along its route and a great increase in mining activity in that part of the Territory. The principal exports from the Territory are gold and silver from its mines and cattle from its hills. Products of the farm, even if in excess of the wants of the people, could not pay cost of transportation to other markets and compete with them in price. The hostility of the Indians in this and the past two years has done much to retard immigration and prevent the settlement of remote and isolated valleys. Notwithstanding all the drawbacks heretofore encountered, the prosperity of the people appears to be satisfactory. Better buildings are being erected both in town and country, and general thrift and contentment seem to prevail.

IDAHO.

BY M. BRAYMAN, GOVERNOR.

THIS year (1879) has been one of general thrift and prosperity. Agriculture has been remunerative. Mining has developed with remarkable success in various parts. Many thousands have been added to our population. Schools are encouraged. General health has prevailed. In the administration of justice and the management of public affairs great advances have been made, and the interests of the government and Territory cared for with improving economy and fidelity. With the advent of railroads, and the improvement of highways now in progress and in prospect, a large immigration may be looked for, and the facilities for bringing in machinery and supplies will cheapen transportation and give life to enterprise. The mild climate of Idaho, its rich resources, its healthfulness, its soil capable of such rich returns, will in time, under favorable legislation, make it the home of a vigorous and enlightened people.

BOUNDARIES.

The Territory of Idaho, from its southern base upon Nevada and Utah, in latitude 42° north, to the British possessions at 49°, covers a length of about four hundred and ten miles. In width it is two hundred and fifty-seven miles at its southern and sixty miles at its northern limit. It is separated from the State of Oregon and the Territory of Washington on the west by a direct meridian line, broken by the course of Snake River, which forms its western boundary for about one hundred and fifty miles. On the east its wide base lies against the Territory of Wyoming, while the Bitter Root, an almost impassable range of mountains forming a natural boundary, separates it from the Territory of Montana. This peculiarity of conformation accounts for the inconvenient shape of the Territory.

Since the organization of Idaho, under provision of the act of March 3, 1863, its area has been reduced to form other Territories, until it now comprises 86,294 square miles, equal to 55,228,160 acres. An approximate estimate of the quality of these lands will afford—suitable for cultivation in their natural state, 15,000,000 acres; capable of reclamation by irrigation, 12,000,000 acres; grazing-lands, 5,000,000 acres; timber-lands, 10,000,000 acres; mining tracts, 8,000,000 acres; the 4,228,160 acres of desert are destitute of timber and minerals and beyond the reach of irrigation. Large portions of the mining tracts bear timber also.

ARIZONA.

BY GENERAL JOHN C. FRÉMONT, GOVERNOR.

ARIZONA has remained shut up and barred out from progress by its inaccessibility. There were neither railroads to it nor in it, nor any roads other than those afforded by the natural surface of the ground, and these are rendered more than ordinarily difficult by the hot, dry, and sandy or stony ground over which lie the approaches to the Territory. In the Territorial laws these are spoken of as *desert roads*.

Lately it has been made possible to reach Arizona on rail from the East by travelling along the 42d parallel of latitude down to San Francisco, in longitude 122°, and thence south-eastwardly backward 720 miles to Yuma, east of longitude 115° and south of latitude 33°. This isolation has kept it shut out from immigration and precluded the development which its great resources would otherwise have commanded. The language habitually applied to it is very descriptive of its remoteness. Californians and Arizonians alike speak of going *outside* when travelling to Arizona, and *inside* when returning to the surrounding territory.

Broken ranges of mountains, swelling occasionally into lofty peaks and pine-covered masses, and alternating evenly with elevated valleys or mountain-basins of greater or less size, represent in general terms the face of the country in Arizona. Its water-ways are the Colorado and Gila Rivers with their tributaries, of which none enter either stream in the lower part of its course. The valley of the Colorado, between its river-hills or bordering mountains, is dry, stony, and barren, the mountains naked rock. Crossing these in journeying from Ehrenberg eastward, a traveller in spring would find this country covered with bloom, the shrubs and trees being represented mainly by acacias and cacti, and the ground covered with low-flowering plants among grasses growing thinly. Except for some shrub-like trees and gigantic cactus (*Saguara*), *ocotillo*, and yucca trees, the ridges herealong are still of naked, glistening, and black or barren rock, showing no signs of water. The acacias, *Palo verde*, and other trees crowd down into the dry stream-beds, reaching after the water below the sands, but the *ocotillo* and the tree-cactus delight in the stony and dry mountain-sides. In the rainy season these stream-beds are short-lived torrents. This is the country traversed by the *desert roads*. But this character of desert, applied to the valleys, comes only from the heated air and absence of water, and not absence of vegetation. A running stream would make anywhere here a garden.

After some seventy miles, as the crow flies, over such country, what may be called *fertile mountains* are reached; that is to say, mountains more or less covered with shrubs and grass, and having springs and running streams, and affording good cattle-ranges. Continuing eastward, the country in this respect steadily improves, until, after travelling over about a hundred miles of air-distance from Ehrenberg, scattering junipers of very sturdy growth appear several feet in diameter, with here and there small oaks and locust trees; and presently the road enters among pines, which thenceforward generally cover the more upland parts of the country to the eastward.

The elevation here is probably 5000 feet in the valleys, the surrounding mountains rising several thousand feet higher. On the higher ranges, such as the San Francisco and Mogollon, these open woodlands become extensive forests, where the pines reach sometimes a solid growth of six feet in diameter. From Prescott the San Francisco Mountains show grandly in the horizon of hills, some sixty-five miles away to the north-east, and 12,700 feet above the sea. These and the Mogollon Mountains are the principal water-sheds of Arizona, rising from elevated plateaus of 6000 or 7000 feet into peaks between 9000 and 13,000 feet above the sea.

In contradistinction to the Eastern States, where the streams maintain themselves in gathering strength from mountain to sea, dryness is one of the striking features of this whole elevated region. Streams and springs are few and far apart. The larger streams gather no affluents, but waste themselves in absorption and evaporation, and the smaller ones usually sink and disappear under the first valley which they enter, where the soil is generally light and loose enough to absorb them. But the water can there always be found—in the lower country at variable depths of fifty to two hundred and fifty feet, and usually only a few feet below the surface in many of the upland valleys. This may give the necessary provision of water for the farms in the valleys, while the mountains furnish it sufficiently for stock. There are two seasons of falling weather—the heavy summer rains, when the washes and stream-beds become temporary torrents, and the winter season of rains and snow. Now, at the end of October, the falling weather of the winter has not yet commenced except in the high mountains. The days are warm, the sky is uninterruptedly cloudless, but ice makes at night, and a light snow has just fallen on the San Francisco Mountain. The grass there is beginning to dry up, and the northern face of the mountain is probably covered with snow.

The Little Colorado and Salt River regions are reported to be the granaries of the Territory. Their valleys are becoming garden-spots, and the bordering mountains great stock-ranges, where the cattle are sometimes too fat to be driven. Like California, the country is favorable to animal life. In the Salt River Valley there are probably 100,000 acres under cultivation; in the Gila Valley, between the Pima villages and the mouth of the cañon, about 50,000; in the Santa Cruz Valley, about 25,000; and 25,000 more in all the southern district. In the Salt River Valley the amount under cultivation is being rapidly augmented to the full extent of the water-supply. On the San Pedro River the land is sparsely occupied, and mostly for grazing; and farther to the eastward the country is better adapted to grazing than agriculture. Many years ago I found on the San Pedro and in the neighboring country many wild cattle which had belonged to ranchos now deserted, where the people had been killed or driven off by Indians. So far as my present knowledge goes, the grazing and farming lands comprehend an area about equal to that of the State of New York.

The climate of Arizona depends of course upon latitude and elevation. Heat is the dominant feature, and this in the lower country is of an intensity seemingly not due to the latitude alone. In the dry, naked valley of the Colorado River the summer heat is intense, and the season of summer encroaches largely upon spring and autumn. Over the eastern part of Southern Arizona it is the same. North of the Gila River, and fifty miles east of the Colorado, the heat is already tempered by the elevation, and farther into the interior the increased elevation and wood-covered mountains make a pleasant and healthy climate. South of the Gila the open, low, dry, and hot region extends farther to the eastward, but the eastern half offers a fine country, increasing in good character to the south up to and beyond the boundary-line. Generally speaking, the climate is noticeably healthy. The heat of the sun does not produce the fatal effects of extreme heat in the moist climates of the Atlantic coast, and though the country itself may be said to have regular chill and fever, varying usually in temperature more than 30° between three o'clock in the afternoon and three o'clock in the morning, this disease is almost unknown to its people. No instance of it has been known on the Colorado River, and though there is something of intermittent fever at Tucson, it is thought due rather to the alternate wetting and drying of the ground by irrigation than to any climatic influence.

But the chief industry of Arizona—that upon which the others will mainly depend, and that upon which, in fact, the Territory depends for value—consists in the development of its mineral wealth. It is pre-eminently a mineral region, capable of sustaining a great mining population. Without enumerating others, silver, gold, and copper seem to be the ores most generally diffused throughout the Territory, and among these silver is the *characteristic*. Silver, in combination with gold, copper, lead, and other metals, extends in numerous veins of greater or less size and value from the Colorado River on the west to the eastern boundary-line of the Territory. These have been partly resolved into districts, where, up to this time, mines or lodes of greater value have been discovered grouped together in belts or basins.

The Mineral Park district has a belt of this kind which is reported to be nearly a hundred miles long, carrying between porphyry walls a mile and a half breadth of productive ore-matter, which is interspersed with veins, principally chlorides of silver. These are said to be very rich, reaching several hundred dollars the ton. The whole mass is said to carry silver.

The Bradshaw district is said to be full of large, permanent veins, upon some of which mines have been opened that are producing ores of extraordinary value. I mention these as having come more particularly to my knowledge since my arrival, but similar reports are coming in from other parts of the Territory, and more especially from the south-eastern extremity, where veins have been opened which give promise of greater richness in gold and silver than any hitherto discovered. In the immediate neighborhood of Prescott are rich mines. Want of transportation, and consequent want of population and money, together with the sense of insecurity still existing, have prevented a full knowledge of these lodes as well as a development of those already known.

Left to themselves in the mean time, many settlers, instead of becoming farmers in grain, have become small farmers in gold and silver, locating veins or placer-grounds which they work themselves.

These gold or silver farms, as they may be called, yield a small but sure product, for which any town is the market. In Arizona are found the only instances within my knowledge where three or four men working together, without money or outside aid, have managed to develop veins into regular silver-mines, which have already yielded several hundred thousand dollars, with a promise of still greater success. But these are the solitary examples of opening large mines without money. The "silver farms," as I have designated them, are smaller enterprises. By a moderate use of money in directing and aiding this kind of labor the general government might come in aid of this industry, and open out a prospect for employment to the large class who of late years have been suffering from want of it, and the utmost exertion of whose skill and intelligence has not been able to command a support. Aided by the government in a way which might be indicated, any man might here find room for his labor, needing only his own resolute, stout work to pick fortune from the earth.

Gold in veins and placers is variously found throughout the Territory. Like Missouri and Utah, Arizona has her Iron Mountain, and copper ores of rich character, carrying with them silver and gold, are found in great force. A large percentage of copper is found in the upper workings of silver ores. Many years ago, and before our occupation of the country, I found in Southern Arizona the trail of wagons engaged in transporting copper ore from the Upper Gila to the city of Chihuahua, the silver and gold found in the copper being sufficient to defray the cost of the long and hazardous journey. Notwithstanding the desultory working of the mines, the actual weekly shipment of bullion, by way of Yuma, to California, is about one hundred thousand dollars.

There is a Territorial prison supported by the Territory, and located by law at Yuma. It is managed by a board of Territorial penitentiary directors, who audit claims and make such rules and regulations as they think proper for the discipline and management of the penitentiary.

The Legislative Assembly of Arizona meets biennially at the capital on the first Monday in January. Representation is apportioned according to population, and the members of the Assembly are elected by counties at the general election held throughout the Territory every two years on the Tuesday after the first Monday in November.

Every male citizen of the United States, and every male citizen of Mexico who shall have elected to become a citizen of the United States under the treaty of peace exchanged and ratified at Querétaro in 1848 and the Gadsden treaty of 1854, and every male person who shall have declared on oath before a competent court of record his intention to become a citizen of the United States, and shall have taken an oath to support the Constitution and government of the United States, of the age of twenty-one years, who shall have been a resident of the Territory one year next preceding the election, and of the county or precinct in which he claims his vote ten days, and whose name is enrolled on the great register of such county, shall be entitled to vote at all elections which are now or may be hereafter authorized by law.

ARIZONA.

BY JOHN WASSON, SURVEYOR-GENERAL.

ACCORDING to departmental estimate made some years ago, Arizona contains just about 73,000,000 acres of land, 5,000,000 of which are surveyed. The general character of the topography, soil, proportion of arable land, productions, pasturage, minerals, timber, water, etc. is the same as that of New Mexico, Colorado, Utah, Nevada, and Idaho. The Territory was created by act of Congress approved in February, 1863. For ten years its progress was slow, because of the constant hostilities of the Indians, its isolation, and lack of speedy and cheap transportation. The United States census of 1870 showed a population of 9658, exclusive of Indians, but owing to the danger of Indian attacks and the refusal of the military authorities to furnish the marshal with available assistance, he made no effort to enumerate some settlements. Under authority of Territorial law a census was taken in 1876, showing about 30,000, exclusive of Indians; but the enumeration was made by and under special direction of the several counties, and as legislative representation was based thereon, and the location of the capital depended on the action of the legislature thus formed, the said census was made to show a much larger population than existed. Conservative estimates place the present population, exclusive of Indians, at from 30,000 to 33,000, with a steady and rapid increase. The population of nearly all the towns is visibly increasing, and new towns and mining camps have sprung up during this year.

There are three marked divisions of surface-land in Arizona—viz. valley, mountain and mesa, or table—their areas rating in the order named.

NEVADA.

HISTORY.

NEVADA is a part of the territory ceded to the United States by Mexico in the treaty of Guadalupe Hidalgo, February 22, 1848. It was at first a part of California Territory, and was subsequently attached to Utah. It was constituted a Territory in March, 1861, with somewhat smaller boundaries than at present. Its admission as a State was discussed in 1863, and a convention called to form a constitution; but the constitution was rejected, on the ground that the population was insufficient for the maintenance of a State government. In 1864 an enabling act was passed, under which a constitutional convention was called, met July 4, 1864, and agreed upon a constitution, under which the State is still governed. The constitution was ratified, and Nevada admitted into the Union as a State October 31, 1864. Additions were made to its territory by Congressional enactment in 1866. Its immense mineral wealth foreshadows for it a brilliant future. This State has an area of about 81,539 square miles, or 52,194,960 acres.

PHYSICAL FEATURES.

The greater portion of Nevada is included in what is known as the Great American Basin, which has for its surroundings the Sierra Nevada on the west and the Wahsatch Mountains on the east. It is bounded north and south by cross-ranges, and has no outlet for its waters. This vast region is a table-land about four thousand feet above the sea, and the mountains in this vicinity rise from one to eight thousand feet above the level of the sea. About twelve thousand square miles in the southeast of the State are outside of this basin, and belong to the Colorado River Basin, whose lofty table-lands and deep cañons have been elsewhere described. The Sierra Nevada Mountains constitute the western boundary of the State, their eastern slopes only being included within it. Most of the mountain-ranges are parallel to each other, and have a general course from north to south. In the south-west is an isolated range, the White Mountains. The eastern slope of the Sierra Nevada and the Humboldt, East Humboldt, and Toyable ranges have a considerable number of streams, which, however, disappear very suddenly from the surface, and reappear as lakes or pools farther on. The valleys watered by these streams are in part fertile, but their lowest portions are occupied by muddy pools, impassable in winter from the depth of the mud.

The agricultural lands of Nevada are estimated at 17,608,960 acres; reclaimable swamp-lands, 74,880 acres; mountain-range land, only available for grazing, and that during only a part of the year, 21,520,280 acres; and barren, sandy, and worthless lands, 2,151,680 acres. It is doubtful if there are, or have been within the last hundred years or more, any active volcanoes in Nevada, though some of the peaks have shown symptoms threatening eruption; but no one can traverse its mountains and valleys without finding abundant evidence of the great extent of volcanic action in the past.

The surface of the valleys and plains is almost entirely Tertiary, Quaternary, or Alluvial in some of the lower portions of the valleys, but everywhere the numerous mountain-ranges have a uniform constitution, the Azoic and metamorphic rocks being upheaved, granite or gneiss and trachyte, rhyolite, and basalt above, and every ridge is crowned with Silurian rocks, limestone, sandstone, etc., all crystallized by the intense heat through which they have passed. On many of the bleak and bare mountain-sides, utterly devoid of vegetation, the lava is still visible, though of course changed by the lapse of time. This Great Basin must have been in ancient geologic times the bed of a vast sea until the subsequent upheaval, which may have been aided by some subterranean drainage of the waters. The region outside this Great Basin, belonging to the Colorado Basin, is Eozoic and Silurian in about equal areas. There are marked evidences of volcanic action.

MINERALS.

Gold, except in combination with silver, is not abundant, but some of the argentiferous ores contain a large amount of gold in combination, and this seems to increase with the depth of the mines. The Comstock Lode and Consolidation companies, since the great progress made in Sutro Tunnel, are yielding increased amounts of gold, much free gold being found in the ore-veins. In the Humboldt and Walker River regions gold quartz-veins of considerable promise have been discovered. Silver is, however, the staple mineral product of Nevada, and the yield of this metal is increasing with great rapidity. The silver-lodes are found in almost every part of the State, some yielding from $65 to $100 to the ton, others ranging from $450 to $2500 or more to the ton. The number of mines in this State is very large, and new mines are constantly being opened. In the autumn of 1874 the number of mines was 243 in twelve counties, and the product of gold and silver for that year was $35,402,263, of which $22,000,000 came from Comstock Lode. The Sutro Tunnel is three miles and a half in length, and passes through all the ramifications of the Comstock Lode in Virginia City and Gold Hill, draining the mines at a depth of nearly three thousand feet.

The other minerals of Nevada are lead, copper, and iron in various forms. There are numerous mineral springs and some geysers in the State.

AGRICULTURE.

While Nevada will never be largely agricultural, it possesses a sufficiency of arable lands to supply, with the aid of irrigation, possibly the needs of such a population as it is destined to have, and its mountain-slopes and some of its valleys will prove to be among the best grazing-lands of the Pacific region. Its timber-lands proper, those on which grew the lofty pines of the Sierras, are of very moderate extent, not exceeding 400,000 acres, and much of this is being cut off to supply the demands of the mining districts. The flora of the State, except on the Sierras, differs materially from that of California. Of the sixty-five natural families of plants catalogued in the State, many are represented by a large number of genera and species.

ANIMALS.

The animals are those of the Pacific slope—the grizzly bear, the Mexican bear, cougar, wild-cat, lynx, Rocky Mountain sheep, antelope, deer (two or three species); and most of the smaller game, including the sage-hare, sage-grouse, are the most characteristic mammals. The larger lakes are stocked with trout, salmon-trout, etc., but in the shallow lakes these do not succeed well.

CLIMATE.

The climate of Nevada is characterized by great extremes. In winter snow falls upon the summit of the mountains, though there is not much in the valleys. The air is dry, the winds strong, and, though the sunshine is bright and pleasant at midday, the nights are often intensely cold. In January the mercury falls to from 10° to 16° below zero in the valleys, and much lower in the mountains; but this severe cold lasts but a few days, though it may be repeated. About the last of February the approach of spring is announced, though there may be piercing winds and sharp frosts, chilling rain and snow, in March, and even April. Thunderstorms of great severity occur in April and May, and into June. When these have passed away the dry season prevails until October throughout the western, central, and northern parts of the State. The air becomes heated, and whirlwinds and spiral columns of dust are raised to great heights. The temperature rises to 100° or 105°, but usually only for a few days. It falls every night to between 70° and 80°, and does not average in August more than 90° at midday. In the eastern part of the State there are frequent thunderstorms in summer and till September 15, and the heat is longer continued and more oppressive. There is less intense cold, with very little snow or frost in winter, in South-eastern Nevada, and the culture of cotton and the sugar-cane has been attempted there. The climate is remarkably healthy and invigorating.

EDUCATION.

Education is carefully looked after, public schools generally being accessible to all. The State University, located at Elko, affords opportunities for higher education. Among the State eleemosynary institutions may be named the Orphans' Home at Carson, which, though yet in its infancy, constitutes the germ of a commendable institution.

Carson City, the capital, had in 1870 a population of 3042. Virginia City, the largest city in the State, had in 1879 an estimated population of 25,000. The principal towns are Gold Hill and Hamilton, each having from four to five thousand inhabitants.

THE SUTRO TUNNEL.

BY ADOLPH SUTRO.

IN the construction of this tunnel we had a severe struggle to get along. On the one hand we had people opposing us, and on the other hand we encountered the difficulty of raising money sufficient to carry on the work; and that was about the "toughest job" of all. But still we succeeded. There were some gentlemen who took broad views of the matter, and, partly through their influence and aid, the money was forthcoming, and after that we got along reasonably well.

In one way and another, we encountered many difficulties in doing the work. We had to work our way inch by inch through solid rock. In these tunnelling operations we had first to drill a dozen or twenty holes, charge them with giant-powder, explode the blast, then wait for the smoke of the powder to disappear before we could commence loading the débris on the cars for removal. Under the circumstances one cannot get ahead very fast; but, altogether, we made quite as rapid progress as has ever been made in any similar undertaking. In fact, our progress was more rapid than was the construction of the Hoosac, the Mont Cenis, the St. Gothard, or any other tunnel.

A CHAPTER ON MULES.

Up to the present time, all the transportation has been done by means of mules. We found it more convenient to use mules than to use steam, because under ground steam is fatal to life. We are now preparing to use compressed-air motors, built on the same plan as those in use on Second Avenue in New York. We have now two motors building in England. We have been using mules for years, and have found out that they are tolerably good animals; but there is a prejudice against mules, though they are very intelligent. I think that I could write a chapter on their traits, as I have had a very extensive experience with them. It has been said that they have a strong propensity for kicking, but I have never seen them kick when in the tunnel. They become very tame under ground; in fact, they become the miners' pets. The men become quite attached to them, and as the shift-mules pass along by the men at lunch they will often receive from one a piece of pie, from another a cup of coffee, etc. When a signal is given to fire a blast the mules understand the signal, and will try to get out of the way of it, just as the men do. Of course, under ground it is very dark, and the mules become so accustomed to the darkness that when they go out into the sunlight they cannot see very well, and when they go back from the sunlight into the mine they cannot see at all. So we are in the habit of covering one eye with a piece of cloth whenever they go out, and keep the covering over the eye until they go into the tunnel again; we then remove the cloth; so they have one good eye to see with. We had to adopt this plan for preserving their sight, because the mule is so stubborn that he will not pull unless he can see his way ahead. We have found out another thing about mules. We tried horses at first, but we found that whenever anything touched the ears of a horse he would throw up his head and break his skull against the overhanging rock; but if you touch a mule's ears he drops his head. For that reason we could not use horses; we employed mules, and they have answered very well.

OBSTACLES TO PROGRESS.

In carrying on a work of this kind we meet all sorts of difficulties. Now and then we would get indications of water. The men would put in a blast, and the water would pour out in a perfect torrent, and the men would have, at times, to quit temporarily to escape it, and wait until the water had subsided sufficiently, so that they could go to drilling again. Every now and then we would come to a clay that would swell and cave, so as to reduce our progress of one hundred and fifty feet (and afterward with improved machinery of three hundred feet) per month to less than fifty feet per month. Sometimes we could not keep the roof up. As soon as we would get started a little way in our work of excavation the rock would yield, and hundreds of feet would come pressing down on the timbers with such force that it was almost impossible to resist it. The worst ground that we came to was the swelling ground. This is sometimes clay, and sometimes it is rock. The moment you dig into it, it swells out, and no matter what size of timbers you use, it will snap them off as if they were but matches. Nothing will resist it. You must let it swell. In one place the swelling was so great that the track swelled up a foot or two seven different times, and each time we had to cut it down. The timbers used are a post and a cap. The pressure on this cap would be so great that the post would be pressed through the cap in twenty-four hours, just as though the cap were a piece of cheese. The only way to keep the timbers from breaking in such ground was to employ men to ease up the ground behind the timbers. That is to say, they would take away the rock or clay from behind the posts from time to time, until, after a year or so, the ground settles down to its natural state and does not swell any longer. We have very little trouble of that sort now; but I suppose that we shall encounter it every now and then as we go on with the lateral tunnels.

BAD AIR.

The greatest obstacle encountered by us was the heat and the poor air. Our last opening to the surface was at Shaft No. 2, about nine thousand feet from the tunnel-entrance. From there we had to go to the Comstock Lode, a distance of eleven thousand feet, without any natural air connection. After we got in to a distance of seventeen thousand feet from the mouth of the tunnel the heat became so intense and the air so bad that it was almost impossible to keep the air sufficiently cool and pure to sustain life. There was not oxygen enough in the air to make our candles burn. Although we blew in air by means of blowers and air-compressors, still at times there was not sufficient air to enable the men to work. In the place where the men were at work we could generally manage to keep the air sufficiently pure, but at some distance back from the face of the tunnel the air was so bad that one could hardly exist. In fact, in going through these portions of the tunnel the men would often give out; and as for the mules, we could not get them there at all. A mule would make straight for the air-pipe, and you could not get him away. We had one mule that would not go away from the air-pipe at all. They beat him, but it was of no use. He had to be carried out, and that mule escaped; he never went into the tunnel again. A shift-mule would always want to go to where the stream of air was rushing in, and he would monopolize it all to himself. He would never leave it; but would stand there, and as he bobbed his head up and down past the pipe you would hear the air whistling by him.

ACCIDENTS.

We had some sad accidents happen. The air-pipes are made of galvanized iron, and the leakage is prevented by wrapping the joints with canvas, which is covered with tar or with white-lead. I recollect that one day after a blast had been fired one Garnett, the man whose duty it was to keep these joints wrapped, went forward (he was nearly fainting) to the end of the air-pipe near the face of the tunnel, but before he got there he fell down in a swoon. When the blaster went forward to examine the blast which had just been made, he found that two of the holes had not gone off, and so he re-connected them and fired the blast while this poor man was lying on the ground. It did not kill him, although he was riddled with rocks. He had about a hundred large and small pieces of rock in him, one being in the back of his head. I thought that he could not live for ten minutes, but he is alive now and as well as ever. The most curious part of it is, that for a long time previous this man had been in ill-health, and that application of rocks cured him. He has told me often since, "That confounded thing cured me." It was rather a severe cure, but it was effectual.

As we approached Shaft No. 2, nine thousand feet from the tunnel-entrance, which had been abandoned some time previous because it had filled by a great influx of water to the depth of about nine hundred feet, we bored a diamond drill-hole into it, and the pressure of that column of water, nine hundred feet high, was so great that it threw out the drill-rod and cast it a distance of several hundred feet, although the rod weighed several hundred pounds.

CARES.

Not long ago some timbers broke down, and the report came to me that a man had been killed. We found, however, that he was not injured, but that he had been caved on and could not get out. I started in with the doctor to see how he was getting on. We found that all the work had stopped, and that the man, who had been working in the ditch which we were then constructing in the floor of the tunnel for the purpose of carrying off the hot water, had been caved on and become surrounded by a lot of loose, fine gravel up to his chest, and that the water running in around this gravel had packed it so tightly that the man could not move. We had to get him out in some way, and so three or four men (which were as many as could get into the confined space) got down alongside of him and tried to dig him out; but as fast as they would dig the gravel would cave in again. When I reached the place the man had been fast for three or four hours. The miners had built dams above in the tunnel to stop the water from flowing down, for if the water had been permitted to come down it would soon have risen to his mouth, and would have drowned him. He was so fast that he could only move the upper part of his body a little. I urged the men to work away with all their might at the dam to keep the water back; but after a while they reported that it was of no use—that the water was rising above the dam. We did not want to see the man killed, and used every effort to rescue him. I told the men to pass a rope under his legs and try to pull him out. We thought we had better pull him out, even if it should injure him somewhat, rather than let him drown; but as soon as we began to pull he commenced to cry out, so that we had to give that plan up. Then the men dug again for a while, until the foreman came and said that if we did not get him out within ten minutes the water would be down in such volume as to drown him. Then the men worked again with the rope for dear life. At last they got one leg out; then they gave another jerk, and brought the man out.

HOSPITAL.

As I have remarked, we employ a surgeon. There were many accidents, although we had less than there were in other works. In the Hoosac Tunnel one hundred and eighty-five men were killed in the construction of the work. In our tunnel but twelve men were killed, and I do not think that of the twelve more than three or four were killed by anything actually happening in the tunnel itself. I told our men several years ago that every man employed by the company must pay three dollars per month toward a hospital fund—that the company could not afford to give the men all the attention that they ought to receive in case of accidents. The men remonstrated a good deal against this; they did not wish to spend their money in that way; each one thought that no accidents would happen to himself; but I made this payment compulsory, and after a while the men became reconciled to it. We employed a physician and opened a drug-store. If a man was injured he received every attention. He had the care of nurses, physicians, and medicine. But these miners are all members of an association, the Miners' Union, which does not permit any man to work a shift of eight hours under four dollars per day. All the mine-managers have agreed to yield to their wishes, and I think a man working in these hot places well earns his four dollars. But sometimes the Union will interfere with us where it should not. They sent a deputation to me not long ago to say that we were not paying our men four dollars per day. I said that we were. They said that we deducted three dollars per month for the hospital, and that therefore the men only received one hundred and twenty-seven dollars per month, which was not four dollars per day. I replied that that was for the benefit of the men themselves; that it was a work of benevolence; that I had inaugurated it solely for the benefit of the men. They insisted that the men should not be compelled to pay anything to that fund; and as we had to complete a certain amount of work at a given time, and could not afford to get into any trouble with the men, we had to yield in this matter.

STARTING A GRAVEYARD.

One labors under all sorts of difficulties in dealing with the men. It seems ridiculous, but the most difficult thing we had to do was to start a graveyard. It took some three years to start it. Whenever a man got killed or died the men would get up a big funeral, and go off to Virginia City or some other place to bury the man. All work had to be stopped for one or two shifts. They would each lose their four dollars for wages, would pay three or four hundred dollars more for teams, and some would drink so freely as to be unfit for work the following day. I was determined to put a stop to that. So said I to the men, "Why can we not have a graveyard of our own, and bury our men here?" I had a grave dug for the next man that died. The dead man's friends came and said that they would not have the man buried there. I asked them why. They said that it would be too lonely for the poor fellow. This seems ridiculous, but it is a fact. I did not wish to have any trouble over the matter, and so I let them bury the man where they chose. Every time a man died we had just the same trouble again. At last two miners got killed who had not paid their fees to the Miners' Union, and had been discarded. They had no friends there to object, and so we buried them there, and thus were able at last to start our own graveyard.

ADVANTAGES OF THE SUTRO TUNNEL.

The first great advantage of the Sutro Tunnel is that it creates a new base of operations. We open a new surface for mining operations—a surface which is in fact a better surface than the original one. We are down seventeen hundred feet from the surface, and can introduce water through the shafts, and thus get a fall of seventeen hundred feet; or we can take the water which exists at some point between the surface and the tunnel and let it flow down to run the machinery, which is placed at the tunnel-level. We thus could get an abundant water-power. A very small stream of water with a pressure of seventeen hundred feet will give an immense power. The time will come in the working of these mines when they will economize all of the water. In fact, the water which is brought in pipes from the Sierra Nevada Mountains can be most profitably used for that purpose, and the time will come when it will be so used extensively. You can readily perceive that a new surface at that point adds just so much to the working possibility of the Comstock Lode.

The lode extends down indefinitely, and the ore-bodies recur in different places; we cannot tell exactly how or where, because their distribution seems not to be governed by any known law. This tunnel adds to the working possibility of that lode certainly sixteen hundred and forty feet, which is the level at the point where the Savage Shaft is intercepted by our tunnel, and that shaft is away down the hill. This is, of course, an incalculable advantage, for those sixteen hundred and forty feet are surely added to the working possibility of the Comstock Lode, and ought to be worth to it a great many millions of dollars, perhaps hundreds of millions. The Comstock Lode has already yielded something like four hundred million dollars, and there is in it an enormous quantity of low-grade ore which has not been taken out.

UTAH.

WHEN Utah was first settled by the Mormons in 1847, it was a territory belonging to Mexico, but by the treaty of Guadalupe Hidalgo in March, 1840, was ceded to the United States, with New Mexico and the whole of Upper California. The government did not promptly assume sway over this newly-acquired territory, and the Mormons established a government for themselves under the name of the State of Deseret. Congress, refusing to recognize this government of the Mormons, organized the Territory of Utah on September 9, 1850. Brigham Young was appointed governor.

AREA.

Utah Territory is situated north of Arizona, east of Nevada, south of Idaho, and west of Colorado, and is between the 37th and 42d parallels of north latitude and the 109th and 114th meridians west from Greenwich. It has a maximum length of 325 miles by a breadth of 300; area, 84,476 square miles; population, estimated at 130,000. It is intersected from north to south by the Wahsatch Mountains, dividing it nearly equally between the Great Basin and the basin of the Rio Colorado. The altitude of the surface on both sides of this mountain-range is about the same—the valleys four to six thousand feet above sea-level; the mountains, six to thirteen thousand. West of the Wahsatch the drainage is into lakes and sinks which have no outlet, the largest of which is Great Salt Lake, with an elevation of 4260 feet, a shore-line of 350 miles, and an area of three to four thousand square miles. It receives the Bear and Weber and many smaller streams, and also the discharge from Utah Lake through the river Jordan. The latter is sweet water, about ten by thirty miles in extent, the receptacle of American, Provo, and Spanish Rivers. There are numerous valleys, the lowest of them higher than the average summit of the Alleghanies.

ECHO CAÑON, UTAH.

TOPOGRAPHY AND GENERAL FEATURES.

The settled part of Utah lies along the western base of the Wahsatch Mountains, which run through the heart of the Territory from north to south, reaching their greatest altitude near Salt Lake City (where they abut on the Uintah range coming from the east, forming the cross-bar of a T), and almost losing themselves in the sandstone plateau of the Rio Colorado in the south. Abreast of Salt Lake City the Wahsatch range is ten to twelve thousand feet in altitude. Here, within a small area, rise the Bear and Weber Rivers, which empty into Salt Lake; the Provo, which empties into Utah Lake; and some of the main affluents of the Green River, which, with the Grand, become the Rio Colorado lower down. It is in the vicinity of the heads of these rivers that the Emma, the Flagstaff, the Vallejo, the Ontario, McHenry, and various other well-known mines are situated. Nearly one-half of the Territory lies south of the Uintah range and east of the Wahsatch range proper, and is drained by the Green and Colorado Rivers and their tributaries. Its general altitude along these streams is between four and five thousand feet; it is much broken by mountains, and is but partially explored, and not settled at all. It contains many thousand square miles of fine grazing country above the Grand Cañon, with more or less arable land, and no one yet knows what mineral treasures. It is believed that the Atchison, Topeka, and Santa Fé Railroad, after being drawn to the head of the river Arkansas by the mineral attractions of Leadville, will find an easy way through this region, entering the Great Basin *viâ* some of the feasible railroad-passes of the Wahsatch. A wide strip of the western part of the Territoty is lake, sink, mountain, or desert. The inhabited part is chiefly a narrow belt, watered by the streams of the western slope of the Wahsatch range, which lose themselves in inland lakes or basins. The largest and best known of these is the Great Salt Lake Basin.

GREAT SALT LAKE BASIN.

Including the valley of Bear River up to the Gates on the north, and the Utah Basin on the south, whose waters are discharged into Great Salt Lake through Jordan River, this basin is 200 miles in length by 40 or 50 in width. The principal streams which are lost in Great Salt Lake are the Malade and Bear—the latter 300 miles long—on the north; Box Elder and Willow Creeks, Ogden and Weber Rivers, on the east; and City, Mill, and Cottonwood Creeks and the river Jordan on the south. Into Utah Lake flow the American, Provo, and Spanish Forks—though these are not forks, but independent mountain-streams—and Salt Creek. All of them but the Malade have in the Wahsatch range their sources, which collect the snows in winter that give them life and being. Where they emerge from their cañons settlements have been made on them, and their waters appropriated, so far as it can be cheaply done, for the purposes of irrigation, and in some cases of furnishing power for mills. Of these settlements, the largest is Salt Lake City, located about centrally, as regards the length of the entire basin, at the base of the Wahsatch range, ten or twelve miles from the south-east shore of Salt Lake, and containing a population of about twenty-five thousand. The city is supplied with water by City Creek. It is laid out with broad streets and sidewalks, and is built up more or less for two miles square, shade and fruit trees largely hiding the buildings in the summer season. It has ample hotel accommodations, gas, water, and street-cars; is peaceful and orderly; is connected with the outside world and adjacent points of interest or business by rail. Enjoying the most healthy and agreeable climate of perhaps any large town in the United States; with street-cars running to the famous Warm Springs, and the bathing-shores of Salt Lake but a half hour's ride distant on the rail; with peaks of the Wahsatch, the Oquirrh, and other ranges ruffling the clouds at every point of the horizon; with picturesque mountain-cañons threaded by trout-streams accessible by rail,—it is one of the most attractive places of summer resort for tourists seeking health or pleasure in all the world. The eastern edge of Salt Lake Basin is dotted with settlements, and is highly cultivated wherever water can be got on the ground. These are North String, Bear River City, Corinne, Brigham City, Willard, North Ogden, Ogden, Kaysville, Farmington, Centreville, Bountiful, Salt Lake City, the Cottonwoods, Sandy, West Jordan, Deweyville, Lehi, American Fork, Pleasant Grove, Provo, Springville, Spanish Fork, Salem, Payson, Santaquin, Mona, Nephi, and Levan. Ogden, at the intersection of the east and west and north and south railroads, is the town next in importance to Salt Lake City, the capital. It is in the forks of Ogden and Weber Rivers, is within a short drive of fine fishing and mountain-scenery, and is rapidly improving. Great Salt Lake Basin at large has an altitude of about forty-five hundred feet above the sea, and is the paradise of the farmer, the horticulturist, and the grower of fruit. Cut off from it by a low range, now surmounted by the Utah and Northern Railway, toward the north-east is Cache Valley.

CACHE, SAN PETE, AND SEVIER VALLEYS.

Cache Valley is oval in shape, perhaps ten by fifty miles in extent, watered by Logan and Blacksmith Forks of Bear River, and by the latter itself, and sustaining a settlement wherever a stream breaks out of the enclosing mountains. Logan is the principal town of Cache Valley, and thence one drives eastward through Logan Cañon forty or fifty miles to Bear Lake Valley, Bear River here flowing toward the north. Farther on it bends to the west and southward, and, flowing down through Cache Valley, finds its way to Salt Lake. Cache and Bear Lake Valleys have a score of towns and fifteen thousand inhabitants.

To the south-east of Salt Lake Basin, and to be connected with it by rail through Salt Creek or Nephi Cañon this season, lies San Pete Valley, called the granary of Utah, surrounded by mountains except on the south, where the San Pete River breaks through into the Sevier, and sustaining eight thriving towns, all still in their infancy, though founded several years ago. San Pete and Cache Valleys are fine grain-growing sections, but, having colder winters, are not so well adapted to fruit-raising as the Salt Lake Basin.

Next southward is the Sevier River, which has its source in Fish (Indian, Panguitch) Lake, near the southern boundary of the Territory, and runs, like Bear River, a long way north before it finds a way out of the mountains, and turning to the south-west is finally lost in Sevier Lake. Most of the streams in the south-west lose themselves in small lakes or sinks; that is, such as rise to the northward of the divide between the Great Basin and the Rio Colorado country. The Sevier River Valley is occupied, like all the other Utah valleys (and there are many in the recesses of the Wahsatch, and some outlying and disconnected with that range, although of minor importance, which have not been particularly noticed) where a stream breaks out of the adjoining mountains, by a settlement; but, like the other streams, the full capacity of the Sevier River for irrigation has not yet been called into requisition.

GREAT SALT LAKE VALLEY.

The western third of the Territory from end to end is an alternation of mountain, desert, sink, and lake, with few oases of arable or grazing lands. Great Salt Lake covers an area of three to four thousand square miles, and the desert west of it a still larger area. The Sevier, Preuss, and Little Salt Lakes, all together, are small in comparison. Formerly, a mighty river flowed northward from the vicinity of Sevier Lake to the westward of Great Salt Lake, the dry bed of which, nearly a mile in width, must be crossed in going west from Salt Lake City to Deep Creek. Since it dried up hills and spurs of mountains have been upheaved in its course, but the old channel continues on its way up hill and down, and over them all. Divided off from Great Salt Lake by a sort of causeway eight hundred feet high is Rush Valley, containing a lake covering twenty to thirty square miles, where twenty years ago there was hay-land and a military reservation. This, as well as the accompanying filling up of the Great Salt Lake, shows a decided aqueous increase in Salt Lake Basin within that time. Rush Valley has mining and agricultural settlements, but much more pastoral than arable land; and so has Skull Valley to the westward. But from these south to the rim of the basin there are only occasional habitable spots, and they are due to springs.

THE MOUNTAINS.

The mountains are the source of the wealth of Utah, present and prospective, which consists in water and metals. They gather the snows in winter which feed the streams in summer. In the northern part of the Territory the Wahsatch range attains in general a high altitude, with a mass in proportion. There is a large accumulation of snow in winter, and the streams are correspondingly large and numerous. In the southern part of the Territory the main range is lower and less massive; the average temperature is higher, of course; there is less snow, smaller and fewer streams, and more desert in proportion. This part of the Territory is not rich in agricultural resources. The isolated ranges in the Great Basin seldom give rise to streams of much magnitude, and the intervening valleys partake more of the desert character. But all the mountains, so far as known, are full of minerals, and there is generally water enough for the purposes of mining and reducing them.

AGRICULTURE.

Down to June 30, 1878, there were surveyed of public land in Utah 8,178,819 acres of arable, timbered, coal, and mineral land. It is impossible to tell from any accessible data what proportion of it is arable land—probably not more than one-fourth, or 2,000,000 acres.

Irrigation is much used, and is almost an indispensable element in farming. The scarcity of water compels settlement along the streams and by the borders of lakes; but that Utah is productive in the various cereal crops can be realized from the fact that the yield of wheat in one year (1875) was 1,418,783 bushels, while the total value in that year of the various crops was $7,500,000. Improved lands are held at from twenty-five to one hundred dollars an acre, according to location. There are, however, large bodies of government and railroad lands which can be obtained at low rates. But it is more advantageous to colonies than to individuals to purchase these latter, as irrigation can thereby be obtained by the construction of canals at very low cost.

Fruits thrive abundantly in Utah, as apples, pears, peaches, plums, apricots, cherries, and grapes.

STOCK-RAISING.

This is one of the great resources of Utah. The grazing-lands are almost unlimited, including the second tables of the river-courses, the slopes of the foot-hills and lesser ranges not too far from water, the shores of sinks and lakes, and the coves and valleys of the mountains. In the elevated portions of the Territory stock requires shelter, but in the Salt Lake Basin and farther south it generally thrives without much if any protection through the winter. It is estimated by stock-growers and drivers that the Territory turns out yearly forty thousand head of stock from one to four years old, averaging in value $15 a head—a total of $600,000.

The wool-clip for 1878 was 1,600,000 pounds. The Mormon population is chiefly engaged in agriculture, and the wonderful development of the mineral resources is mainly due to the Gentile population, who are really dependent upon the mines for their support.

MINERALS.

Mines were known to exist in Utah, and some attempts were made to open and work them, during the five years next preceding the completion of the Pacific Railroad, but the conditions were not favorable, and little was accomplished. On the consummation of that enterprise, however, attention was recalled to them, and within eighteen months thereafter the streets of Salt Lake City were thronged with wagons and teams bringing ore from almost every point of the compass and from twenty to two hundred miles distant. Rude mining camps, gradually growing into towns, mills, sampling-works, and smelters, began to appear as if by magic.

From the end of 1870 to the end of 1878, as appears from the books of the Utah Central Railroad Company, there were shipped from Salt Lake City 76,912 tons of ore, 109,276 tons of argentiferous lead-bullion, and 8197 tons of lead—worth, in the aggregate, quite $40,000,000. For the last three years the value of Utah's mineral output has been

$18,558,805.48. Most of the ores so far worked have been argentiferous galena, but the present depression in the price of lead decreases the profits realized from that kind of ores. Lead represents only $5,379,446 of the product of the last three years, against $13,137,033 of the precious metals, and of last year but $811,068, against $5,224,580, or less than sixteen per cent. And, further, as the profit on lead has decreased, mines producing gold and silver ores proper have been discovered or have risen into prominence. Such are the Ontario, which has paid forty-two consecutive dividends of $50,000 each; the mines of Silver Reef, which, first discovered two years ago, are now producing fine bullion at the rate of $100,000 per month; and the gold-mines in Bingham Cañon, the ores of which, though of comparatively low grade, are very cheaply mined and milled, and occur, so far as work has shown, in veins or deposits of extraordinary size and strength.

There is not a county in the Territory where mines have not been located and mining districts in greater or lesser number organized. Froiseth's new map of Utah shows eighty of these new mining districts, covering more than one million acres, crowding each other most in Salt Lake, Utah, Juab, and Beaver counties. Box Elder, Tooele, Millard, Piute, and Iron counties have a plentiful sprinkling of them. Wherever there are mountains the prospector has been, and left his footprints in the shape of mining districts. Very many of them are abandoned, it is true, but this is more often on account of inaccessibility, want of capital, and other unfavorable circumstances than because of the lack of merit or promise of the mining locations. After the time necessary to extend interior communication, and to acquire full knowledge of the nature of the ores and the best methods of reducing them, we may expect these districts to be revisited and labor resumed, and with permanently profitable results. The mining history of the Rocky Mountains and the Pacific Slope records nothing more striking than the sudden resurrection of apparently lifeless mining camps. Leadville, Bodie, Salmon River, and Pioche are examples. The records of the land-office in Salt Lake City show 487 applications for patents to mines in Utah, and the issue of 362 patents.

The most important mineral belt of the Territory, so far as known, first makes its appearance on a sort of break-down in the Wahsatch range, drained off north and south, and ultimately west, by the Weber and Provo Rivers, in the vicinity of the Twin Peaks, which are twelve thousand feet above tide-water, and mark the culmination of the magnificent range overlooking Salt Lake City. Thence it extends over the crest of the Wahsatch westward, covering the sources of the Cottonwood and American Fork, crosses Jordan Valley, about twenty miles south of Salt Lake City, and reappears in the Oquirrh, an isolated range separating Jordan and Rush Valleys. It includes the mines of Park City, the Cottonwood, American Fork, Brigham Cañon, Ophir, and Dry Cañon.

Utah is not only rich in the precious metals, but liberally supplied with coal, iron, and other minerals. The supply of coal is absolutely inexhaustible, yet has been somewhat inaccessible. Railroads are now being built that will remove this difficulty, and will aid greatly in the development of the manufactories and smelting-works by supplying fuel at low prices. Marble and other building-stones are scattered over Utah in every variety and in inexhaustible supply. Professor Newberry says that no equal area of the country surpasses Utah in the richness and variety of its mineral deposits.

RAILROADS.

There were at the end of 1878, including the Union Pacific and Central Pacific tracks in Utah, about 340 miles of standard gauge, 190 of narrow gauge, 15 miles of tramway, and eight or ten miles of street-railway, with 961 miles of telegraph-lines. The branches are penetrating all parts, and soon nearly every portion of the Territory will be accessible by rail.

CLIMATE.

The climate of a mountainous country like Utah will vary considerably with its varying altitudes and exposures. The inhabited parts of the Territory range in general between four thousand three hundred and six thousand three hundred feet above the sea. Seventy per cent. of the population is settled in valleys not exceeding four thousand five hundred feet in elevation, and sixty per cent. in the basin of Great Salt Lake. In these lower valleys the climate is mild and agreeable. Its perpetual charm cannot be conveyed by meteorological statistics. The atmosphere is dry, elastic, transparent, and bracing; and the temperature, while ranging high in summer, and not altogether exempt from the fickleness characteristic of the climate of North America in general, compares favorably in respect of equability with that of the United States at large, and especially with that of Colorado and the Territories north and south of Utah. Its range upward is less than that of St. Louis, Philadelphia, and New York, to say nothing of that of Arizona; while in the other direction there is no comparison, either with the Eastern States intersected by the same isothermal or with Colorado, Idaho, and Montana.

HEALTH.

The climate is favorable to consumption and bronchial troubles. The best treatment known for consumption is a year of steady daily horseback riding in a mountainous country, with plain diet. Rheumatic fevers are common throughout the country; there is a mountain-fever, which yields readily to treatment, however.

GREAT SALT LAKE.

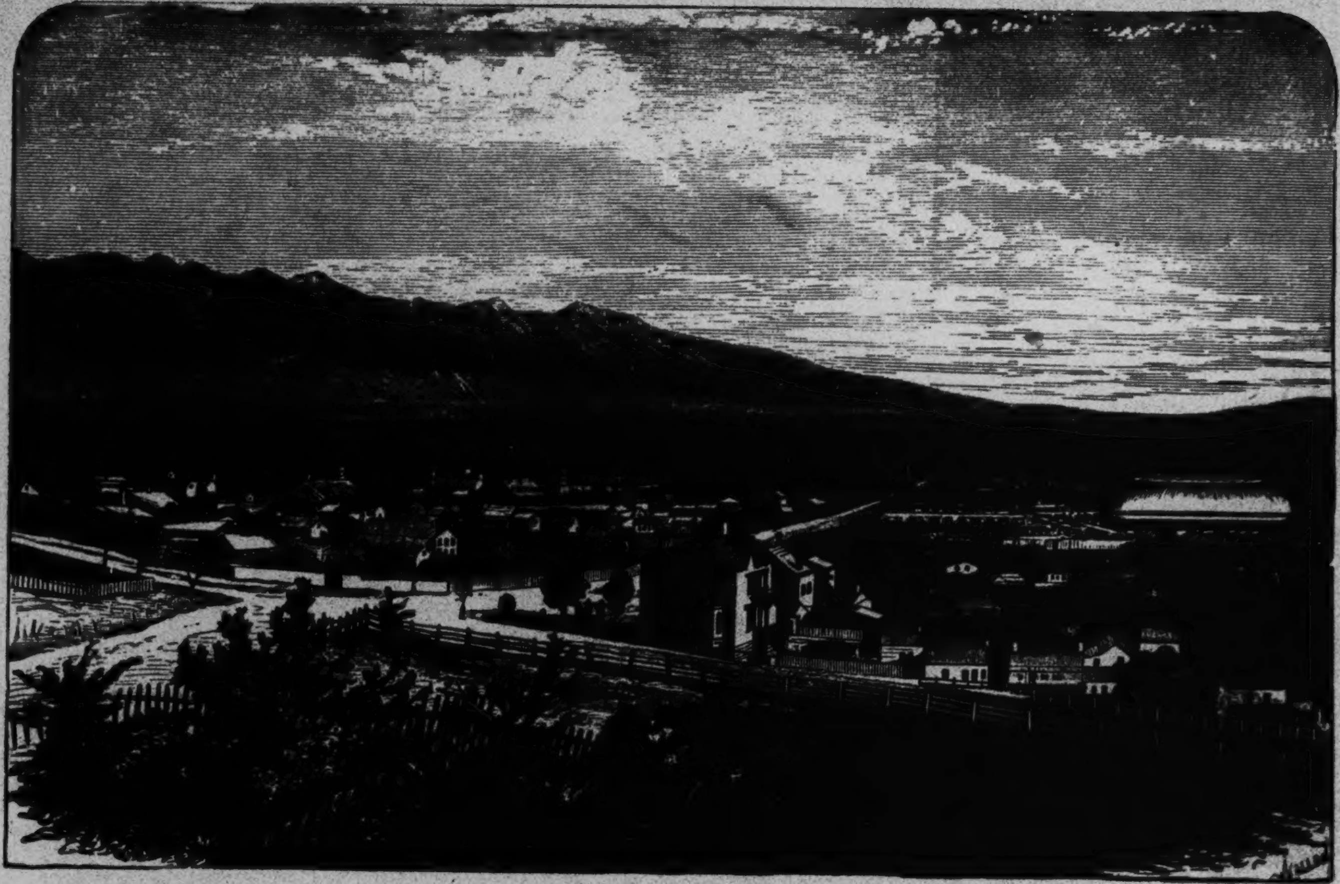
The first mention of this lake was by the Baron la Houtan in 1689, who gathered from the Western Indians some vague notions of its existence. Until Colonel Fremont visited it in 1842 on his way to Oregon, it is probable that its dead waters had never been invaded or the solemn stillness of its islands broken.

It covers an area of three to four thousand square miles, and its surface is higher than the average Alleghany Mountains. The depth ranges from twenty to sixty feet. It has become a famous bathing resort.

SALT LAKE CITY.

Those who have seen Salt Lake City, particularly in spring, declare it to be one of the most beautiful places in the world. The Wahsatch group of the Rocky Mountains lies to the north, east, and south, and the Uintah range to the south-west. About seven miles west of the city is the Great Salt Lake.

The city is situated at the northern extremity of the valley. There is a gentle slope toward the south and west. The extent of the valley from north to south is perhaps thirty miles, and its width is about fifteen miles. To the east rise the mountains, some of them to the height of twelve thousand feet, and on their northern slopes snow may be seen throughout the year. South of the valley lies Utah Lake. Northward from this lake flows the Jordan, a beautiful stream of fresh water, which empties into the Great Salt Lake not far from the city. Salt Lake City is at present supplied with water chiefly from City Creek Cañon, toward the north and east. Plans are now being carried out by which a more abundant supply may be obtained from the Jordan. The city is laid out in squares. Seven blocks, with the crossings, make a mile. The streets, with their sidewalks, are 132 feet wide, 16 feet being allowed for a sidewalk. On each side of the streets, for their whole length, are irrigating-ditches. Through these the cool water from the mountain-snows is always flowing in great abundance. By these the gardens are watered, and the trees



SALT LAKE CITY AND WAHSATCH MOUNTAINS, UTAH.

planted everywhere by the sides of the streets have an abundant growth. The trees mostly used for shade are cottonwood, box-elder, and locust. The ever-shifting scenes upon the mountains near, caused by sunshine and clouds, together with the dry and tonic air, make Salt Lake a beautiful and desirable location for a home.

POINTS OF INTEREST.

One of the most interesting points in the vicinity of the city is Fort Douglas, a well-built full-regiment post, located on a plateau about three miles east of, and five hundred feet above, the city. The post and grounds are laid out with taste, a small stream of mountain-water making the culture of trees, shrubbery, grass, and flowers possible. The elevation gives almost a bird's-eye view of the city and valley. In the distance lies the Dead Sea of America, a blue band drawn along the base of island-mountains, the vistas between which are closed by more distant ranges. In the north the Promontory divides the waters, ending far out in the lake. Across Jordan Valley the Oquirrh rises to a lofty height from the lake-shore, white with snow a great part of the year, and often veiled by clouds. On the south a low cross-range completes the enclosure of Jordan Valley, which lies an unrolled map at one's feet. An even finer view, and one much sought, is afforded from Ensign Peak, north of the city, one might say at the head of Main street, although its ascent must be afoot.

Among the attractive objects in the city are the Tabernacle, a unique structure, with its immense organ; the foundation and rising white walls of the Temple; the Salt Lake Museum, a valuable collection of Utah minerals and curiosities from many lands; and the Warm Springs, nicely improved and with commodious buildings and conveniences for all sorts of bathing. There are some good public buildings and many noble private residences and beautiful grounds. A drive round the city and to Fort Douglas is interesting and enjoyable. It might well extend to Emigration Cañon, near the fort, or to Parley's Cañon, farther south. The country on the Cottonwoods, adjoining the city southward, is highly improved for several miles out. The system of city streets, making blocks of ten acres, is extended over this rural suburb, where they become country lanes, and afford the most delightful drives through cultivated fields, orchards, and improvised groves of trees. Occasionally there is a small artificial or natural sheet of water, which has been improved and beautified with especial reference to the wants of pleasure-seekers.

MORMONISM.

ORIGIN AND EARLY HISTORY.

DURING the years in which Mormonism was gaining a foothold religious experience throughout the country was marked by peculiar physical manifestations. Upon the visitation of the Spirit, as was supposed, many were seized with convulsions. Some would shriek and yell; some would fall in fits; the "Jerkers" were remarkable for convulsive twitchings of the limbs. New England was included within the range of these manifestations. The phenomena of Spiritualism may have been connected with religion. At any rate, a large number of New England people, religiously reared, united their fortunes with the phenomenal Christianity of Mormonism. In the year 1827, when scarcely twenty-two years of age, Joseph Smith obtained the golden plates upon which was written the Book of Mormon. In 1830 three thousand copies were printed. This book abounds in expressions peculiar to Scripture. Large fragments are transferred bodily into it. The expressions "I say unto you," "and it came to pass," "behold," "verily," are repeated *ad nauseam*. Lured by these, multitudes of men and women, believers in the Bible, accepted also the Book of Mormon. Large numbers, too, of Campbellites from Pennsylvania and Ohio joined the Mormons. Among the New England names we recognize are Young, Smith, Eldredge, Wells, Snow. Apostle Wells numbers among his direct ancestry one of the early governors of Connecticut. The Mormons declared that their religion was a return to the primitive Christian faith. Gifts of tongues abounded; gifts of healing were there. Joseph was a great healer, even to the performing of miracles. He had a large frame, and frequently in his addresses was able to produce great enthusiasm among his hearers.

Kirtland, Ohio, was the first gathering-place of the Saints. Afterward many gathered in Jackson county, Missouri. Later still, Nauvoo was founded. Here Joseph gathered around him the choicest and most intelligent spirits. Here the Mormons built a splendid temple—not one stone of which now remains to mark the site—and put the finishing touches upon it after it had become a well-understood fact that they must shortly abandon it for ever. A military organization was formed, called the Nauvoo Legion, and the Mormons were fast aspiring to become a political power. Joseph had already been nominated for the Presidency of the United States. The Mormons were united and obedient; they formed a compact society. At this period there existed an organized band of marauders and horse-thieves whose line of operations extended from Canada to Iowa. When a man had once crossed the river into Iowa, he was safe, for he was in a wilderness. So bold had these men become, and so complete were their plans, that the people of Illinois had become desperate, and were bent on their extermination. Some of these marauders, for protection, joined the Mormons at Nauvoo, and were safe. Their real character was doubtless unknown to the Mormons, but their villainies were attributed to the Latter-Day Saints. This fact, added to their political unity, gave the Mormons a very bad reputation, and a band of men desperate enough to determine to drive out the Mormons or exterminate them was readily formed. A mob gathered. Joseph and his brother were murdered in prison at Carthage. The people determined to find refuge in the wilderness. Brigham Young was the great executive of the hegira. Florence, on the west side of the Missouri, six miles north of where Omaha now stands, was the rallying-point of the pilgrims. They arrived too late to press on that season. In the Mormon burying-ground there are the bodies of seven hundred of the fugitives, two hundred of them children. In the midst of this trying period they were sustained by great faith and a heroic courage, and the cold nights were frequently enlivened by the sounds of music and dancing. Large numbers dropped out of the ranks on the way to obtain employment among the farmers and to support their families during the winter. Some went as far as Missouri. Many of these never returned. Early in the spring the caravan took up its march for the West.

On the 21st of July, 1847, the Mormon pilgrims from Nauvoo saw for the first time the Great Salt Lake and the beautiful valley to the east of it. On the 24th their president arrived. "This," says a Church writer, "is the day whose events are of the most importance to mankind of any that ever transpired, the creation of Adam and the birth of Jesus Christ alone excepted." The recurrence of this date has ever since been celebrated as more important than any national holiday. The Fourth of

July is a quiet day in Utah. If one wants to be reminded of that brave day of old, he must go to some mining camp where Gentiles outnumber the Mormons. In 1848 about four thousand entered Salt Lake Valley, and suffered much from want of food the following winter. Soon prosperity came, and for several years continued, until Brigham Young began to assume a more and more arrogant manner. From this time date the bad stories told of him. The multitude of murders attributed to him began at about this time. In 1856 the Federal judge was compelled to close his court. Next year President Buchanan sent three thousand men to protect the government officials. Young was filled with fury; great numbers of apostates were murdered. In this year the Mountain Meadows massacre took place. Six hundred murders have been traced to this period, and most of them are believed to have been perpetrated by Mormon officials or at their instance, and in obedience to unequivocal hints from Brigham Young or in harmony with his inculcations. I quote from a Mormon publication (*The Journal of Discourses*) a dream of Brigham Young's: he is warring against apostates, and says he dreamed of an encounter with two ruffians: "With that I took my large bowie-knife, that I used to wear as a bosom-pin at Nauvoo, and cut one of their throats from ear to ear, saying, 'Go to hell across-lots!' The other one said, 'You dare not serve me so.' I instantly sprang at him, seized him by the hair of the head, and, bringing him down, cut his throat. . . . . At this I awoke. I say, rather than that apostates should flourish here I will unsheath my bowie-knife and conquer or die. Now, you nasty apostates, clear out, or judgment will be put to the line and righteousness to the plummet. [*Voices generally, 'Go it! go it!'*] If you say it is right, raise your hands. [*All hands up.*] Let us call upon the Lord to assist us in this and every good work."

This arrogance of Brigham Young and his followers did not hesitate to defy the United States government, and the courts were closed. In 1858 the United States troops marched into the city of Salt Lake, which had been abandoned on their approach.

An indication of the rapid growth of population is seen in the fact that twenty thousand people left Salt Lake City at this time to find refuge somewhere at the south: many of the people thought their destination would be Mexico.

The storm blew over. The leaders accepted Buchanan's "pardon." One condition of their acceptance was that the army should not be stationed within forty miles of the city. The permanent encampment was Camp Floyd, about forty miles south of the city.

The early years of Mormonism in Utah were hard years. Some years produced abundant harvests; others were almost years of famine. The present population of the Territory is about 130,000, mostly poor and mostly ignorant. Many are devoted to the Church, but there are great numbers of apostates. If the seventeen millions spent by the government in the Mormon war could now be devoted to educational purposes in the Territory, the Mormonism of the coming generation would be wonderfully different in character from that of the present.

TEMPLES.

These are all built of cut stone at an enormous cost. Brigham Young computed the cost of the one now building in Salt Lake City at nine millions of dollars. Two years ago the Seventies made a vigorous effort to obtain money for its completion. They raised one hundred and sixty thousand dollars. This raised the wall four feet. Everything built or planned by Young bears the characteristic mark of massiveness and solidity. The foundations of the temple are said to be sixteen feet below the surface of the ground and nine feet thick. The dimensions are—two hundred feet long, one hundred wide, one hundred high. The tower will be one hundred feet additional. There are two winding stairways at the east end of the building, each stone of which is carefully cut and cost nearly one hundred dollars. The granite is very hard, and the cost of preparing it is thus greatly increased. It is obtained from Little Cottonwood Cañon, in which the famous Emma Mine is situated. It is transported now by rail; the distance is about thirty miles. Before the railroad was built the stone was brought by teams. Several thousand dollars were expended in building a canal for this purpose, but it was finally brought to a stop by the discovery that water would not run up hill. The temple has reached the height of fifty feet from the ground. During the last four years it has been raised eight or ten feet a year.

There is a magnificent temple already completed at St. George. One is in process of erection at Manti. One will be completed at Logan next year, and its cost will be four hundred thousand dollars.

These temples are not for public worship; they are solely for the celebration of the rites of the Church. No public assembly will ever meet in them. Baptisms will be performed there for the living and dead; endowments will be bestowed there; marriages, earthly and celestial, will be performed within these walls; within their darkness will be kept whatever records may exist of polygamous marriages. These are the uses to which all these temples will be dedicated. Out of deep poverty the people have built them, and who can wonder that they are poor? Millions are spent to encourage and deepen superstition. Scarcely any effort is made or money expended to build up a system of common schools.

Mormonism of itself is incapable of rising higher. Those who are faithful to its authoritative teachings deride human learning and believe in keeping the people down. The cure for Mormonism must come from without. The establishment and wise management of good schools in Utah offer more hope for the Territory than all other means. The wise teacher wins his pupils. When the pupils are won the fathers and mothers are with him. This is also the cheapest method of solving the Mormon problem. Closely following in the track of these schools, distinctively Christian effort should be made. Another part of the work must be done by the courts. A deaf Congress should be made to hear the voice of the country. It should be made to pass laws against polygamy which can be executed in Utah. When these instrumentalities are in operation a good foundation will have been formed for an enlightened public sentiment to reach the ignorant classes through the press.

PRESENT CONDITION AND ATTITUDE OF MORMONISM.

Mormonism to-day is a different thing from that of Brigham Young's time. Shortly before his death he founded the order of Enoch. This was a stock company which proposed to monopolize all the trade of Utah. Branches of the great Zion's Co-operative Mercantile Institution were established in all parts of the Territory. The small shopkeepers were "counselled" to put their stock or its proceeds into this mammoth corporation, of which Young was the leader. One man, Bishop Wiley of the Third Ward, ventured to oppose him; he would allow none of his people to enter in. Brigham Young was indignant. Wiley was deposed; another was ordained in his place. But the people still stood by their former bishop. He continued his ministrations, his successor was ignored, and at Young's death Wiley was in formal possession of his office as before. This shows that even while the prophet was alive dissensions were breeding. The people felt the need of breathing freer. The priesthood has always laid claim to greater tolerance than the "sectarians" of the world, but the Saints found that for them there was but one path to walk in. There is at this present moment more reality to their boasted freedom than ever before. The generation of adults of course is fixed; it cannot be made over again. The young people are coming up in their own way. Lieutenant Gunnison so far back as 1852 wrote: "Of all the children that have come under our observation, we must in candor say that those of the Mormons are the most lawless and profane." Careful men, who have been intimately acquainted with the leaders of the Latter-Day Saints and the history of the Mormon Church, declare that morals among them are in a much lower state than in early times. The announcement of the doctrine of polygamy was a great stumbling-block to the earlier Mormons, and thousands of them apostatized. Hundreds of families in Northern Illinois and Southern Wisconsin, among the best families in the States, belonged to that revolt against Mormonism. It has been estimated that of all who have been connected with the Mormon Church at least seventy per cent. have apostatized. These figures are probably exaggerated, but the defection has been very great.

The best of the Mormons apostatized at the time referred to, of the converts in England as well as this country. When the Saints reached Salt Lake there was greater obedience and unity. John Hyde, an apostate, says that "in 1854, Brigham Young commanded the people to consecrate by legal transfer all right and title to all personal property. A law passed through the Legislature making such transfers strictly valid; quit-claim deeds were drawn up, and from their land to their wearing apparel the majority of the people transferred everything to Brigham Young as trustee, in trust for the Church of Jesus Christ of Latter-Day Saints, and some in the exuberance of enthusiasm threw in their wives and families."

Gradually that wildness of fanaticism died out through contact with Gentiles and other causes. Even the tithing is in many cases neglected. When paid it is largely in "truck" of various kinds.

But grossness of manners and language has been gradually disappearing. Brigham Young was both profane and obscene. Heber Kimball was vulgar and low beyond the language of the slums, even in his public addresses. Mormon women have often risen and left the Tabernacle, disgusted and outraged by his obscenity. Men who have been intimately acquainted with the system from its early days assert confidently that the morals of the people, particularly the rising generation, are far below the standard of the early Church. Polygamy has much to answer for in producing this result. Lack of education and home-training explains much of this condition. Brigham Young said that not a dollar of his money should go to educate another man's child. He was true to his word. The money of the people has gone, not to put up and equip schools, but to build temples. There is no system of free schools in the Territory. Yet the settlements are favorably situated for them. Water is scarce in Utah; people flock where they can get it. The result is, that the settlements are compact, and children can be educated with far less expense than though the settlements were sparse. There are a few free schools under Mormon management, but these depend wholly upon the enterprise of single communities. There are three such schools in the Territory, one of them in Salt Lake. The tuition in all the rest ranges from three to six dollars and fifty cents per quarter. This is in addition to the Territorial tax for school purposes. Scholars of the grade of the Fifth Reader pay six dollars. The people are poor and cannot afford the money. Multitudes of Mormons therefore gladly avail themselves of whatever opportunities Gentile schools afford. About thirteen years ago St. Mark's School was established in Salt Lake. Some thousands of children have already come under its beneficent influence, and their Mormonism is thus either modified or entirely lost. The Methodists had a few years ago a flourishing school of more than two hundred pupils; through various causes only a small fragment of that number remains. The Presbyterians have a good school of about one hundred and fifty pupils. All of these schools have primary departments, and all are full. Salt Lake Academy, more recently founded, is more specially devoted to the training of pupils in higher studies and for the preparation of teachers for home-work; it has no primary department. The number of students is 120. The New West Education Commission has established two free schools in Utah, and Presbyterian missions with schools connected are doing a great work in eight or ten stations outside of Salt Lake. The Mormons have a "university" of a grade considerably below the average New England high school. Three competent instructors are employed. The mental discipline of their students suffers from a pernicious system of electives and other causes.

The condition of the ward schools in Salt Lake City is deplorable. Not more than fifty per cent. of the children of school age attend school, and those that do, suffer from inadequate instruction. The schools already established by Gentile influences and money are, by their very presence here, exerting a powerful influence in improving the Mormon schools of every grade. One thing that hinders their influence is the fact that no Gentile or non-Mormon is admitted as teacher in any Mormon school.

There is another agency at work in destroying priestcraft in Utah. I refer to the mutual-improvement associations of the younger Mormons. These are at present in a very crude state, and under the management of the elders are groping in the dark. But the spirit of free inquiry is there, and it will bear fruit.

The plague-spot of Mormonism is polygamy. From what I have written above a stranger might think this evil is destined soon to fall. It is not so. All the prominent men of the Church are polygamists. Personally, many of them are agreeable men, and men of ability too. Great numbers of the children are born in polygamous relations. Will these deny their mothers? Those who think so do not know human nature. Polygamy is the strongest bond that keeps the Mormon Church together to-day. Let a man's mother be a plural wife; let his best friends be compromised by that system; let these bonds be strengthened by innumerable cross-links of relationship. This is the way it is with polygamy in the Mormon Church. The Mormons are estranged from respectable Gentile society. They must hang together, as Franklin said of the signers of the Declaration, or they will hang separately. They know it, and they *will* hang together. The government must be determined, wise, and steady to deal properly with this plague. The slowness of Congress, its selfish dallying, drive the thoughtful element of the Gentiles in Utah to rage and despair. It would probably cost less to abolish this evil by education than to move Congress to act in the premises. Many men familiar with affairs in Utah look to see the present weak trifling carried on till it finally ends in bloodshed.

The Mormon Legislature, just adjourned, numbers among its thirty-nine members thirty-five polygamists. These men make the laws of the Territory. George Q. Cannon goes to Washington and manipulates the whole country for them. The Willits bill is approved by the district attorney of Utah, by the judges, and the best lawyers in the Territory. It is referred to committee; Proctor Knott puts a quietus to it, and holds himself up to all patriots for the infamy a traitor deserves. The president of the Mormon Church, John Taylor, is defiant in regard to polygamy; Cannon is its great apostle.

Two thousand five hundred Mormon immigrants reach Utah annually. They are the poorest and most ignorant of Europe. It is from these that the polygamic ranks are largely recruited; and enough more are coming. Last year it is believed more such marriages took place than in many years.

DISLOYAL MORMONISM.

BY REV. JOSEPH COOK.

[DELIVERED IN THE OLD SOUTH CHURCH, BOSTON.]

THE PRELUDE.

BLUEBEARD asks for a seat in the Senate. He stands with one hand locking the door of his chamber of horrors, and with the other he knocks for admission to the supreme legislative assembly of the foremost Christian republic of all time. He has stood in this attitude for twenty-three years, and is becoming importunate.

How large is the territory over which the Mormon Bluebeard exercises sway? Here is a superb iron relief map of the United States, kindly loaned to me from among their wonders of illustrative apparatus by the New England School-Furnishing Company. Its sections are divisible, and I take up Utah in one hand and Vermont in the other, and place the latter on the former. It is literally true, as you notice, that Vermont can be hidden away in one of the valleys of Utah, and be no larger than a babe in a bed of full size. Utah has 84,576 square miles of territory; Vermont only 9612. I take up Massachusetts, and find that I can hide her away in one corner of this polygamous couch. [*Laughter.*] You say that I am too suggestive in my metaphors, and yet this is your Territory, directly under the control of Congress, and its legal condition depends upon national legislation as much as softened wax depends for its form upon the fingers which manipulate it. This Territory under your laws sends to Congress a polygamous delegate, who sits down at the side of your representatives on equal terms.

We are poorly perceptive in the East of the capacities of the region called the Basin States. Take up Idaho, or Arizona, or Nevada—regions into which Mormonism is extending its political power—and observe how small Massachusetts is, placed anywhere on these gigantic stretches of the mining districts and the pastures between the Rocky Mountains and the Sierra Nevada [illustrating]. Here is Professor Brewer's map of the forests of the Union [referring to *Walker's Statistical Atlas of the United States*, open on the platform], and I beg you to notice that a thickly-wooded region occupies great portions of Idaho, Montana, and Wyoming. Colorado has a large extent of forests—not as dense as those of Oregon and Wisconsin and Maine, but still, as this map shows, about equal in density to the woods that cover Ohio and Indiana. Utah, as you notice, has more forest than Nebraska. I beg you to study Professor Hayden's fascinating map of Colorado, a piece of the finest geographical work ever done in America or anywhere in the world [referring to the new government map of Colorado, open on the platform]. You will find in it at a glance proof that Colorado and Utah are not deserts. We think of the Basin States as if they were a dry land, where no man is, and in which no multitude of human beings can ever find a prosperous home. This spotted tract of yellow [referring to the map of Colorado] represents a stretch of sage-brush. When irrigated that land is tropically fertile. This other shade of yellow represents good pasture-land. Here grows the strangely nutritious buffalo-grass, which amazed me by its sweetness when I plucked tufts of it near Cheyenne. On the rivers, where the color deepens, you have good agricultural land. But notice the large stretch of forests along the skirts of the mountains. The different colors of green show the pines, the cedars, and the quaking aspens. If you look at the other indications on this map, you will find whole tiers of counties underlaid with coal, and these mountain-ranges thickly sifted in all their rifts with iron and silver and gold. The same is true of Nevada and Utah. The silver-mines of Utah have yielded forty million dollars' worth of ore in the last ten years. A Salt Lake daily newspaper publishes five columns of mining news. The American Bluebeard rules over the American Potosi.

Put your ear, then, on the Wahsatch Hills; listen to the subterranean conspiracies in politics at Washington; fasten your attention on the throbbing of the heart of Christian America; and summarize, if you can, this whole Mormon case in a series of propositions, one flowing from the other:

1. The present anti-polygamy laws of the United States do not make polygamy an offence in all cases, but only polygamy which is not yet three years old. The statute of limitations bars prosecutions for polygamy after three years from the date of the ceremony of the polygamous marriage.

2. Weak and toothless as this law is, it remained a dead letter on the national statute-books until the decision of the Supreme Court in the Reynolds case proved it to be constitutional.

3. Under the present law the leaders of the Mormon hierarchy who took plural wives more than three years ago cannot be prosecuted. The Mormon delegate in Congress, unless he has taken a fifth wife within three years, cannot be reached by this enactment. In practice, polyga-

mous marriages take place in Utah every month, are kept secret, and the violators of the law expect at the end of the three years of concealment to confess the marriages and laugh at the law. Judge Van Zile of Salt Lake City, whose opinion is everywhere respected among the Gentile population of Utah, lately said: "Removing the limitation clause and making polygamy a continuous offence is my pet measure. As it is now, an old man marries a young girl secretly, lets her live with her parents three years, and then claims her and snaps his fingers at the officials."

4. The present national laws against polygamy have another weakness, in the fact that they require evidence of the ceremony of a plural marriage as proof of polygamy. The ceremony usually takes place in the secrecy of a Mormon endowment-house, and trustworthy evidence as to what is done there cannot be obtained from a Mormon before a Gentile jury.

Not long ago a Mormon official was imprisoned three days for refusing to reply to questions put to him on cross-examination before a Gentile jury about a ceremony performed in a plural marriage in an endowment-house. When the time of punishment was over a vast procession of Mormons met him at the prison-doors, to welcome, as they said, Daniel from the lions' den. That collection of the followers of the false American prophet trampled the American flag under their feet within three days of the time when I saw the streets of Salt Lake City, and the tremor which their disloyal proceedings had caused was felt not only there, but from side to side of the Union wherever the news was understood.

5. It has been proved by the confessions of apostate Mormons and by the experience of Federal courts in Utah that the oaths taken in the Mormon endowment-houses are considered by the Mormons to be of paramount authority over any oaths taken before a Gentile court under State or national law.

6. It has been proved by long experience that the Mormon endowment-house is a nursery of disloyalty.

The new Endowment-House in process of erection on the Temple area in Salt Lake City is surpassed by not more than two or three buildings on this continent in cost and magnificence. It has narrow windows and walls of granite nine feet thick. It looks like the Bastile or Cologne cathedral without its towers. It may in fifty years become serviceable as a State-house for a loyal legislature, but whoever sees it will not be likely to conclude that Mormonism is to vanish in an hour.

7. The oaths of the Mormon endowment-house cannot be violated with-

out penalties which extend from the confiscation of goods to the severance of the windpipe. [*Sensation.*]

Brigham Young was often profane in the pulpit, and sometimes made there a gesture intended to symbolize the cutting of the throats of apostates. "They are wicked men," he would say, "and they ought to be cut off;" and with these words he would draw his hand across his neck, with the extended thumb rubbing against the throat [*sensation*], and the secret police well understood his meaning. You may say I am here trespassing on the region of the imagination, but I hold in my hand an important document, just issued at Salt Lake City, entitled "*The Mormon Endowment-House:* A Graphic Exposure of the Treasonable Institution where Polygamous Marriages are Solemnized. By an Eye-witness." Judge Boreman, who sent it to me, writes on it, in his own hand: "All apostate Mormons say that this statement is true, and I learn through private sources that the Mormons admit its correctness." According to this document, four grips are given in the course of the ceremonies in the endowment-house. As I read here, "The penalty for revealing the first grip is that you will have your throat cut from ear to ear and your tongue torn from your mouth. The sign of the penalty is drawing the hand, with the thumb pointing toward the throat, sharply across the neck." What did Brigham Young mean by this gesture, repeated again and again in public a week or two before certain secret murders? The penalty for revealing the second grip is "to be sawn asunder and your members cast into the sea. The sign of this penalty is drawing the hand sharply across the middle of the body."

When the chief power of the Mormon Church is summarized in one man like Brigham Young, and he says that the followers of Joseph, the son of Joseph Smith, who do not believe in polygamy, should be cut off, and makes these definite gestures before an audience who have all gone through a Mormon endowment-house, is that anything you can laugh at, my surprising friends? This is your Territory. This is what has happened under your sweet and holy laws. The graves of those who have been buried in Utah after secret murders are so numerous that, with the Federal judges of Salt Lake City, I believe that if the winding-sheets of these victims could be put together into one banner the shadow of the black flag would cover half Utah. Twenty years after the Mountain Meadows massacre, John D. Lee, one of the principal tools of the Mormon priesthood in that ghastly slaughter, expiated his crimes by his execution on the spot of their occurrence · but men more guilty than he yet go in Utah unwhipped of justice.

8. Were it not for the presence of Federal troops in Utah to-day these penalties, including the death of apostates by what is called "blood atonement" (that is, the shedding of the blood of an apostate to save his soul), would be executed by the priesthood, as they were executed in the bloody years of the supremacy of Brigham Young.

"Blood atonement" Brigham Young preached from the pulpit again and again, and not in rash, extemporaneous language. The utterances of Brigham Young concerning "blood atonement" were fully reported by stenographers, and then revised and pruned by his own secretary and published in the official Mormon newspaper in Utah; and not only there, but in *The Journal of Discourses*, a Mormon publication issued at Liverpool. Judge Cradlebaugh on the floor of Congress read passages out of these speeches, and they are cited at large in the best books on Mormonism. (See Stenhouse, *Rocky Mountain Saints*, p. 299.) This measurelessly monstrous doctrine was not only preached, but again and again, in the days when Mormonism was isolated from the Federal power, "blood atonement" was practised by those who thought that the shedding of the blood of an apostate was the only way to save his soul.

9. It is therefore evident, from the experience of the Federal courts in Utah, that the laws against polygamy need amendment in three respects:

(1.) Polygamy should be made a continuous offence, existing as long as the parties live together as man and wife.

(2.) The statute of limitations should not begin to run until the parties cease to live together.

(3.) Living together as man and wife, and recognizing each other as such, should be sufficient to warrant conviction. No ceremony should be required to be proved.

10. But Mormonism, as based on the endowment-house oaths, has two tap-roots—polygamy and priestly despotism; the latter supported by the tithing system, the police system of spies, and the power of life and death.

11. *Under a State constitution prohibiting polygamy the second of these chief roots would still exist, even if there were passed an amendment to the national Constitution prohibiting polygamy.*

12. Admitted to the Union, under State and national constitutional provisions prohibiting polygamy, Utah, manacled by this priestly despotism, with its tithing system and the power of life and death, would have a Mormon governor and State officers, and Mormon State judges.

Every murder and like felony in the State would be tried before these judges and before Mormon juries.

13. It is the opinion of the Federal judges now in Utah that this set of circumstances might not only prevent all future trials of Mormon murderers, but inaugurate a reign of terror.

14. Gentile mining, smelting, railroad, and agricultural operations under a Mormon governor and legislature would be taxed so as to become unprofitable. Gentile schools and churches would be so discriminated against by the State law that they would cease to exist.

15. This aspect of the Mormon question has great significance for those who are giving money to establish Gentile schools and churches in Utah. At present there is no security and no certainty that these institutions will be allowed to exist in Utah as a State under the theocratic power of the endowment-houses and the Mormon priesthood.

16. An amendment to the national Constitution prohibiting polygamy, although useful and desirable, would therefore not be sufficient to settle the Mormon question. If Utah were admitted as a State with the theocratic power of her priesthood unbroken, Mormonism would yet live on that second tap-root. Such a constitutional amendment prohibiting polygamy might tempt political parties in need of the electoral votes of Utah to admit her to the Union, with her disloyal endowment-house oaths in full power over the people, and, by being used as an excuse for an enabling act and blinding the public to the actual perils of the case, work positive mischief.

17. Effective legislation against Mormonism must cut both its taproots; and therefore the legislation needed should strike both at polygamy and at the disloyal hierarchy supported by the tithing system and the disloyal oaths of the endowment-houses.

18. President Hayes proposes to Congress the disfranchisement of Mormons for violating the national laws against polygamy, and also disfranchisement for aiding and abetting those who violate these laws. In detail (see New York *Tribune*, December 26, 1879), the President recommends the establishment by Congress of a board of registration, consisting of the governor of the Territory and the judges of the district courts, or persons who should be appointed by them. The duty of this board would be to pass upon the qualifications of every person who desired to vote in any election or to exercise any of the rights or privileges of citizens. Something like the following examination would take place, as President Hayes thinks:

Are you a Mormon? Yes.

Are you a practical polygamist? No.

Do you support or countenance any one who is a practical polygamist? No.

Are you a member of the Mormon Church? Yes.

Do you pay tithes for its support? Yes.

Who are the officers of the Mormon Church? John Taylor, George Q. Cannon, and others.

Are they polygamists? I do not know. [*Laughter.*]

On such a showing as this the President thinks the registration board would have to refuse the applicant. President Hayes hopes that by applying such a test as this Gentiles only would be able to be registered. According to this plan, no one not registered would be allowed to vote or hold any office under the United States, the Territory, or local government, or to sit on juries. Under these arrangements juries could be trusted and the Territory would be taken out of the hands of the Mormons. One of the first results which the President expects would flow from a political revolution in Utah such as he would bring about would be the election of a Gentile legislature, which would act in harmony with the governor of the Territory. Little by little, under a pressure like this, the President thinks that not only polygamy, but the payment of tithes, would soon become very unpopular among the Mormons in Utah. (See New York *Tribune*, December 26, 1879.) Prominent Gentile residents of Salt Lake City have assured him that neither the institution of plural marriages nor the theocratic power of the Church could survive five years under this proposed legislation, which may God bless and speed! [*Applause.*]

19. There are two parties among the Mormons—one a radical party, representing the hierarchy, and the other a conservative party, made up of men of business and property, who would have much to lose by a collision with the Federal power.

20. President Hayes's plan strikes at the tithing system, as well as at polygamy. It is calculated to divide the Mormon Church, by bringing the radical and conservative parties into open antagonism against each other, and is therefore admirably adapted to break up the power of the disloyal hierarchy.

21. This plan has the vehement approval of Federal judges in Utah; and without its execution their opinion is that the Gentile population there under a State government would have no adequate protection in respect to life, property, and education. The Mormon population of

Utah is now estimated at one hundred and fifty thousand by the Mormons themselves, and the Gentile at only ten or twelve thousand.

22. It is not likely that a Congress which allows a seat to a leprous polygamist will legislate on the Mormon question as the case requires; and therefore the duty of the press and pulpit and independent platform is to arouse public sentiment and bring it up to the height of demanding the practical measures recommended by the Federal judges in Utah and by the national Executive. [*Applause.*]

Over the gate of Brigham Young's grounds in Salt Lake City there is a rude representation of an eagle striking its talons into a beehive. This is an excellent symbol of Mormonism—rapacity preying on industry! [*Applause.*] I have much sympathy with the beehive—none at all with the eagle. [*Laughter.*] I pity the Mormon people; and because I foresee for the Basin region a great future I wish the talons of the voracious hierarchy to be taken swiftly out of the honey gathered in Utah by the energy of these peasants brought over from Europe. But the symbol above the gate is not complete. You must wind around that humming straw hive some emblem of the Mormon secret, deadly police. Let a viper with poisonous fangs coil around the hive and take his directions from the eagle above him, and your symbol is more perfect than it was. And yet it is not complete. You must add the bird of the night (the owl), which often lives, it is said, in the same hole with the rattlesnake. This winged creature will represent the subtlest misleading element in Mormonism—priestly fanaticism; the solemn pretence of possessing individual access to God's secrets; personal inspiration, the idea that God speaks through the prophet, the revelator, and seer at the head of the Mormon hierarchy. There is one other bird that must be added, and the symbol will be complete—the strutting barnyard fowl, emblem of polygamy. [*Laughter and applause.*] Mormonism is the poultry philosophy. [*Applause.*] The Latter-Day swindle arranges human beings as if they were poultry. It gives woman not a home, but a harem and a coop.

The Bible in favor of polygamy! Orson Pratt, when he had a debate on that topic, admitted that he depended on modern revelations for the ultimate defence of plural marriages. The Jews to-day are not a polygamous people, and they have no sacred guide but the Old Testament. It is perfectly well understood that the regulations concerning polygamy in the Old Testament were intended to girdle the tree and make it fall; and it has fallen with the very people who take those Scriptures as their only authority. The unscriptural, the loathsome, and the lawless thing in Mormonism is polygamy. The highest of the ecclesiastics in the Mormon hierarchy, when they are forced to entire frankness, say that they know polygamy is to be defended because of modern rather than by ancient revelation. "Thou shalt not take one wife to another to vex her." This is the true sense of a law in Leviticus (chap. xviii. verse 18). "God shall make of these twain," and not of more than twain, "one flesh." Divorce, adapted to the hardness of men's hearts, was indeed permitted, but it was not so from the beginning. The nature of things, the mysterious divine law which brings the two portions of the human race into the world in substantially equal numbers, is the proclamation of the divine origin of monogamy. When the Mormon ecclesiastics have opportunity to reach out their loathsome hands into the sweet homes of Scandinavia, Belgium, and France and the peasant population of England, and pluck thence the brightest flowers, they may find that polygamy is not assailed as a monopoly. But what if there could be no such supplies from sources outside of their own circles? What if the course of immigration did not alter the natural distribution of populations, and polygamists were to depend on the law of coequal heredity? If they were to be called on to supply their own circles, it would be found that of all the accursed monopolies on the earth polygamy is the worst, for it takes away from thousands the opportunity of founding homes, in order that the few may riot in debauchery under the thinnest of religious disguises.

If there is anything that ought to call down on the American people the thunderbolts of God's justice, it is laughter, indifference, cool political calculations as to the chances of parties when electoral votes are for sale in Utah. It is bargaining with this strutting, polygamous fowl; bargaining with this eagle who is striking his talons into the beehive; bargaining with this viper which coils around the feet of the birds who are his mates; bargaining with the whole loathsome group and bringing them into the Union to keep company in a happy family with the Puritan dove! God avert such a result! [*Applause.*]

You think that by holding the blazing lantern of Christian schools before the eyes of these birds you can frighten them away; but are you sure you are to have the opportunity to hold the lantern there after Utah comes into the Union? I have defended the cause of Colorado College; I wish to-day to lift up my voice, feeble as it is, in support of all enterprises for Christian schools in Utah; but there are great and indispensable preliminaries to the success of these institutions. Once admit Utah to the Union, even with polygamy prohibited by the State and the national Constitution, and let a Mormon hierarchy, with a tithing system and the power of life and death, manage affairs under State rights, and these schools for which you are paying money will be starved to death and taxed out of existence. These are the opinions of Federal judges in Salt Lake City. These views accord with letters from Utah hardly dry from the hands that spread the ink upon the paper, and which I might read here. These are the secret solemn convictions of those who have studied the great problem on the spot. It is for us here on the Atlantic seaboard to join hands with the oppressed populations of the Basin States, and so arouse the patriotic and Christian sentiment of the whole land that any political party which bargains with that group of birds and with that viper shall be crushed under the heel of public execration. [*Applause.*]

OREGON.

OREGON is the extreme north-western State of the Union, being situated between the forty-second and forty-sixth degrees of north latitude. It is bounded on the east by Idaho, on the west by the Pacific Ocean, on the north by the Columbia River, and on the south by California and Nevada. It extends, on an average, for three hundred and fifty miles east and west, and for two hundred and seventy-five miles north and south, and contains 95,274 square miles, with an area of about sixty million acres.

HISTORICAL.

In 1792, Captain Gray of Boston, commanding the ship Columbia, discovered and ascended the river now named after his ship. The discovery formed the basis for the subsequent claim of the United States to, and acquisition of, the territory now embraced in Oregon. In 1804–5 the Lewis and Clarke expedition first made known to the world the great resources of this portion of the Pacific coast. In 1811, John Jacob Astor established a trading-post at the mouth of the river, and it was named Astoria, in his honor. It is now a town, and noted for its extensive salmon-canneries. From 1816 to 1846 the American and British governments held Oregon by "joint occupancy" under a formal treaty. In 1846, Oregon was formally ceded to the United States by treaty with Great Britain, and in 1848 the Territory was organized, and the year following General Joseph Lane was appointed Territorial governor.

Emigration to Oregon was very much encouraged by the "donation laws" passed by Congress, giving to married couples six hundred and forty acres and to single men three hundred and twenty acres—that is, to all who had emigrated, or would emigrate by December 1, 1850. The gold-fever in California attracted many to the Pacific coast, and Oregon received some immigrants. In 1859, Oregon was admitted into the Union as a sovereign State, with a population, at the time, of 52,465 souls. The present population is estimated at two hundred thousand.

GEOGRAPHICAL.

The Cascade Mountains, a continuation of the mountain-ranges of California, stretch across the State north and south at a distance of about a hundred and ten miles from the Pacific. Numerous barren, snow-capped peaks of volcanic origin rise from them to great height, of which the most elevated are Mount Hood, 11,225 feet; Mounts Jefferson, Thielsen, Scott, Pitt, and the Three Sisters. The Cascade range divides Oregon into two distinct sections, known as Eastern and Western. Of these, the former contains by far the most territory, but the latter is more thickly settled, containing nine-tenths of the population of the State.

WESTERN OREGON.

The climate of this section of the State is peculiarly mild and equable. The temperature is moderated by the trade-winds of the Pacific, as well as by the proximity of the great Japan Current or Pacific Gulf Stream. The differences of temperature marking the seasons in other parts of the world being unknown, it may be said indeed that there are but two seasons in Oregon—namely, a wet and a dry one. The wet or rainy season usually begins about the middle of November, and lasts until early in May, with many intermissions of fine weather for days, and even for weeks. From early in May till the end of June the weather is usually warm and clear, with occasional showers, which refresh Nature and dress it in charming verdure. The dry season proper begins about July and lasts until October.

Oregon is almost exempt from the violent atmospheric disturbances so common in the Eastern States. Thunderstorms are of very rare occurrence, and hailstorms, hurricanes, whirlwinds, earthquakes, and other destructive phenomena are almost unknown. The climate is very conducive to health; the exemption from sharp winds and violent changes of temperature thus secured renders the inhabitants less liable to throat and lung troubles, rheumatism, and inflammatory diseases generally than in other parts of the Union. According to the official returns of 1870, the death-rate in Oregon is lower than in any other State or Territory in the Union excepting Idaho, being only sixty-nine per cent. of the population, while in California it is 1.16; Massachusetts, 1.77; Illinois, 1.33; Missouri, 1.63.

SOIL, RESOURCES, AND PRODUCTIONS.

Willamette Valley, the acknowledged garden of the Pacific coast, is one hundred and fifty miles long and thirty to sixty miles wide. In this valley are situated many thriving towns and the mass of the population. Columbia River Valley, Rogue River Valley, and Umpqua Valley, with those of their tributaries, are the principal valleys of the western section. The soil in the river-bottoms is a black loam or marl, with subsoil. In the hill-lands is a red-brown or black loam, not so deep as in the valleys, but sustaining luxuriant grasses. The leading grain staple of Oregon is wheat, which is noted for its superior quality and large yield, and it commands a high price in the grain-markets of the world. The berry is very fair and full, often weighing from sixty-five to sixty-nine pounds to the bushel. Oats take the second rank in importance. The standard weight for oats is twenty-six pounds to the bushel, but the country is so well adapted to their growth that the weight of forty-five, even of fifty, pounds to the bushel is often reached. Barley is also successfully raised. Corn is grown in many localities with success, but is not made a specialty, the average summer being too cool for its successful culture. With good cultivation the wheat-lands will yield from twenty-six to forty-five bushels of wheat per acre, forty to seventy bushels of barley, and sixty-eight to eighty bushels of oats. Cabbages, turnips, squashes, beets, carrots, parsneps, cucumbers, tomatoes, and onions grow in profusion. Potatoes yield from two to five hundred bushels to the acre. The crops of cereals are remarkably free from any drawbacks. No failure of the wheat-crop has occurred since the settlement of the country—that is, during a continuous period of thirty-three years.

Oregon excels in fruit-culture. Apples, pears, plums, prunes, cherries, with all the small fruits, thrive abundantly. Fruit-raising in Western Oregon has already grown to a large business and promises excellent returns.

Timothy or herd-grass grows well in every part of the State, and is the staple product for hay. It cuts three tons to the acre, even in the foothills and mountains. Red and white clover, with proper cultivation, will grow luxuriantly; alfalfa, blue-grass, red-top grass, and orchard-grass do finely everywhere.

The mild winter climate, and the fact that the native grasses remain green during most of the year, make Oregon an excellent country for raising every kind of stock. Oregon wool is of recognized quality, owing to the cool summers, warm winters, and continued green feed for sheep.

MINERALS.

The mineral wealth of Oregon is very great, but as yet imperfectly developed, mainly owing to want of capital. Gold was first discovered in 1851 in the counties of Jackson and Josephine, in the extreme south of the State, and mining industry promises to take a new start here, placer- as well as quartz-mines having been discovered which are very promising. Baker and Grant counties, in Eastern Oregon, have also yielded many millions of the precious metal. In Baker county, especially in the vicinity of Baker City, gold-mining is carried on very actively at this time with good results. On the ocean-beach near Coos Bay placer-mines are worked to a considerable extent. Rich gold quartz-lodes have been discovered and partially worked in the southern part of the Cascade Mountains, but their distance from railroads and the want of machinery for working them have until now prevented their development on a scale commensurate with their richness. The yearly gold product of Oregon represents now a value of over $1,500,000.

Lead and copper have been found in large quantities in Jackson, Josephine, and Douglas counties. Iron ore exists in large deposits throughout the State. Coal abounds no less than iron. The most important are the Coos Bay mines. A fleet of steamers is busy carrying coal from these mines to San Francisco, where it is highly esteemed.

FISHERIES.

The lakes, rivers, streams, and creeks in Oregon beyond the reach of tide-water teem with trout of superior quality. The salmon-fisheries of the Columbia River are of great commercial importance. The fishing-season begins in April, and is over by the end of July. The fish are taken in tide-water by nets and traps in immense quantities as they ascend the river fresh from the ocean. The Columbia salmon is very fat, of peculiarly fine flavor, and is much prized in the markets of the world.

TOWNS.

Astoria, the county-seat of Clatsop county, is situated twelve miles from the mouth of Columbia River. It has a fine water-front and good landing facilities. At present it numbers between three and four thousand inhabitants. The principal business is the canning of salmon.

The city of Portland, built on both banks of the Willamette River, about one hundred and ten miles from the Pacific Ocean, is not only the chief city of the State, but the commercial metropolis of the North-west. It has a most beautiful location and charming surroundings. Ocean vessels of heaviest draught ascend the Willamette River and take in cargoes here. The Oregon Steamship Company's iron ships run regularly between Portland and San Francisco. Other lines continue the trade with Puget Sound, British Columbia, and Alaska. The foreign flags on the shipping at the wharves give some idea of the direct commerce with European and Asiatic ports, while a fleet of steamboats running up and down the Columbia River, besides many railroads now centring here, is required to attend to the interior trade. Portland, with a population of twenty thousand, is perhaps the most flourishing city of its size in the Union. Its business extends far inland and a vast territory is tributary to it. It has a commodious custom-house and post-office, a score of schools, numerous churches, including a cathedral, and a public library that would do credit to a much larger city in any of the older States. The *Morning Oregonian*, a lively and influential journal, is the leading paper of this section, and has a very extensive circulation.

Within the famous valley of the Willamette are situated nearly all the towns in the State. A railroad already two hundred miles in length extends from north to south.

Oregon City, the county-seat of Clackamas county, on the Falls of the Willamette, twelve miles south of Portland, is an important manufacturing point.

Salem, the capital of the State and the county-seat of Marion county, fifty-two miles south of Portland, on the east bank of the Willamette, is a pleasing city of five thousand inhabitants.

Albany, Harrisburg, Corvallis Junction, and Eugene City, on the Willamette, are important towns.

ROUTES AND SCENERY.

"Whether it be business or pleasure that calls him hither, the traveller cannot fail to be pleased with this section of the great North-west," says a writer. "In its scenery, as well as in its natural resources, and in the character of the people, it will greatly surpass his expectations. Oregon may be entered from the line of the Central Pacific Railroad by stage through Northern California to Roseburg, the southern terminus of the Oregon and California Railroad, which runs thence along the Umpqua and Willamette Valleys down to Portland. But the trip from San Francisco to Portland is now made in two days on board a splendid ocean-steamer. From the Golden Gate to the mouth of the Columbia the sail along the coast—with its wave-washed rocks crowned here and there with forests and its indentations shining with golden sands—unfolds five hundred and fifty miles of imposing panorama. The Columbia River, twice as long as the Rhine, five times as long as the Hudson, is far more magnificent than either. The upper Columbia, from Vancouver to the Dalles, is especially rich in splendid scenery. The lower Columbia, from the Cascades to the sea, has no superior on the continent as a commercial inland water-way. Indeed, in some respects the Columbia River is the grandest river in the world. Borne up or down on its mighty flood, where its walls rise thousands of feet above the tide, and cascades of surpassing beauty—such as the Falls of Multnomah—descend from dizzy heights, one gets new impressions of the sublimity of Nature."

The Columbia River possesses many attractions in its wonderful scenery. It is the "great water-way of the Pacific Slope." It drains over four hundred thousand superficial square miles in its course. Rising in the Rocky Mountains, in British America just north of the United States line, it takes a due southerly course, traversing the eastern half of Washington Territory until it reaches Oregon. It then turns directly westward, forming the boundary-line between Washington Territory on the north and Oregon on the south. The Snake, a large and navigable stream, rises far to the south, in Idaho, and joins the Columbia near the point where it first touches Oregon. The Columbia, in its grand march to the sea, bursts through a mountain-range and forms those wonderful series of waterfalls, the Cascades. These, however, are most formidable obstructions to the navigation of the river, but the government is expending a considerable sum in building a canal. The Oregon Steam Navigation Company has built a railroad around them, and freight and passengers must be transferred. The ride over this road is exceedingly interesting. The scenery is wild and magnificent, and you here catch a glimpse of the old fort or block-house where Phil Sheridan was stationed in early days during the Indian troubles. A trip up this grand river is a charming voyage to all lovers of beautiful scenery.

EASTERN OREGON.

In this part of Oregon there is much less rainfall in the winter, and consequently a greater degree of cold and more dryness in the summer, which renders this section even more exempt from throat and lung troubles and rheumatism than in the region west of the Cascade Mountains.

The tide of emigration is toward Eastern Oregon, and the wonderfully productive valleys will soon be populated with an enterprising and thrifty people. The emigration is largely from New England and the Western

States, carrying with it the advanced social and educational character of these localities. With lines of railroad pressing east from Portland, west from the Mississippi, and north through Utah and Idaho, the fertile lands of Eastern Oregon will speedily have enlarged transportation facilities with assured low tariffs.

Stock-raising is more extensively carried on in this section than in any other portion of the State.

WASHINGTON TERRITORY.

BY GOVERNOR E. P. FERRY.

THE Territory of Washington is divided by the Cascade range of mountains into two nearly equal divisions, which are popularly known as Eastern and Western Washington, differing widely in climate, soil, and, to some extent, in productions.

WESTERN WASHINGTON.

A very large portion of Western Washington is covered with dense forests of fir trees of immense height and girth. The average height of these trees is more than two hundred feet, in many cases exceeding three hundred, with diameters up to twelve feet.

Tested by an experience of more than twenty years, fir timber has been found to be a material almost unsurpassed for ship-building. Ships of more than a thousand tons have been built in this Territory *exclusively of fir timber and lumber*, which rank as A No. 1 with underwriters at San Francisco and Liverpool.

Spars from Puget Sound have for many years been shipped in large quantities direct to England, France, and elsewhere on the continent of Europe.

It has been estimated that the cost of building ships here is thirty-five per cent. less than the cost at Bath, Maine, or at any other Atlantic shipyard. In the near future ship-building on Puget Sound will constitute one of the most important branches of productive industry in the Territory.

RESOURCES.

The principal resources of Western Washington are coal and lumber. Coal has been found in nearly every county. In fact, the entire Puget Sound Basin, extending over an area of more than twenty thousand square miles, is supposed to be a vast coal-field. Mines are now in operation in the counties of Whatcom, King, Pierce, and Thurston. The daily production is about six hundred tons, the larger portion of which is exported to San Francisco.

The lumber interest at present takes precedence above all others. There are twelve large saw-mills upon Puget Sound, each having the capacity to manufacture daily from fifty to two hundred thousand feet of lumber. The present annual production is about two hundred and fifty million feet. More than two hundred million feet are exported to San Francisco, South America, the Sandwich Islands, and to other points.

There are also exported from Puget Sound barley, oats, potatoes, wool, hops, hoop-poles, hides, canned and barrelled salmon, oysters, and many other articles. The aggregate annual value of exportations from Western Washington is estimated at over five million dollars.

Four-fifths of Western Washington has a gravelly soil unfit for cultivation. This is especially the case where the fir tree grows exclusively. The other fifth is made up of rich alluvial land in the valleys of the rivers and smaller streams, of prairies, and reclaimed tide-marsh land. On these lands all the cereals except corn, and all the fruits and vegetables grown in the Northern States, are raised, of a quality and in quantity and size only known on the Pacific coast.

While Western Washington as a whole cannot be classed as agricultural, yet it has an area of more than five thousand square miles of excellent farming land, which will be ultimately brought under cultivation and be capable of maintaining a large population.

PUGET SOUND.

The great feature of Western Washington is Puget Sound. It extends from the British line on the north and from the Straits of Juan de Fuca on the west to Olympia in the interior, and has a coast-line of fifteen hundred and ninety-four miles. It can be navigated with safety at all seasons of the year by the largest ocean-steamers or the smallest sailboat. Severe storms on its waters are unknown, and there is not a bar, shoal, rock, or other obstruction to navigation from the Pacific Ocean to Olympia, a distance of more than two hundred miles. It is made up of a continuous succession of bays, inlets, and harbors, and is so dotted with islands that it is impossible to get more than two or three miles from land at any point on its waters. It is, in short, one vast, noble harbor, destined to be the western terminus of the Northern Pacific Railroad, and on its completion, being on the line of the shortest route between the Atlantic

States and Japan and China, it will be the entrepôt of a large portion of the commerce of the Occident and the Orient.

CLIMATE.

Strictly speaking, there are only two seasons in Western Washington—winter and summer. The winter or wet season commences about the first of October and ends about the first of April. During this period there will be many weeks of pleasant weather. The average annual rainfall in the Puget Sound Basin is about fifty inches. It will appear almost incredible that in this northern latitude, between 46° and 49°, ice and snow are seldom seen. The average temperature during the winter months is 39°, and during the summer 63°, a mean difference of only 24°. The maximum temperature for a few days in summer will be about 90°, but the nights are always cool and refreshing. The summer months are exceedingly pleasant, and the climate during this period compares favorably with that of Southern Italy. One singular and as yet unexplained climatic feature is, that thunder and lightning are of very rare occurrence.

EASTERN WASHINGTON.

The vast rolling prairies of Eastern Washington make it one of the best grazing and wheat-growing regions on the continent. There is little timber, except on the margins of the rivers and smaller streams. It has an area of wheat-land capable of producing, with ordinary culture, more than one hundred million bushels annually. A failure of crops *never occurs.*

The present season the yield is regarded as not an average, and it will be twenty-five bushels per acre. Forty to sixty bushels is not unusual. The wheat-product of this region the past season will be about one million five hundred thousand bushels. One million bushels will be transported down the Columbia River to Portland, and from thence to Europe, and, as heretofore, will probably be claimed as a product of the State of Oregon. All the fruits except tropical, and all vegetables, of superior quality, are grown in great abundance.

The climate and soil are particularly adapted to the production of peaches and grapes, large quantities of which are raised of unsurpassed excellence and flavor. A very nutritious indigenous grass, commonly known as bunch-grass (*Festuca pratensis*), grows spontaneously over many thousand square miles, affording excellent range for stock. It is self-curative, and retains its nutritious qualities when allowed to remain on the ground uncut. The raising of stock is extensively prosecuted. A market is found on Puget Sound and in British Columbia, and large numbers are annually driven to the Union Pacific Railroad, and thence transported to Chicago.

It can safely be asserted that Eastern Washington will, in a few years, rival California in the production of all the cereals, both as regards aggregate quantity raised and quality, and will far surpass that or any other State in the average yield per acre.

CLIMATE.

The average temperature in Eastern Washington is as follows: Spring, 52°; summer, 73°; autumn, 53°; winter, 34°. The average annual rainfall is about twenty inches.

AREA.

Washington Territory embraces an area of seventy thousand square miles, being about three hundred and fifty miles long east and west and two hundred miles wide. It extends from the Pacific Ocean to Idaho, and from British Columbia to Oregon. Its surface is diversified by mountain, valley, and plain, more than two-thirds of it being sufficiently level for settlement and cultivation, and much of the remainder valuable for timber, grass, and mineral deposits. It is estimated that there are 35,000,000 acres of timber-, prairie-, and bottom-lands open to settlement. Of these, 20,000,000 are covered with timber, and 5,000,000 are rich alluvial bottom. The population is now estimated at 57,784.

TOWNS.

The principal towns of Western Washington are the following: Olympia, the capital, situated at the head or southern extremity of the Sound; Tocoma, on Puget Sound, is the western terminus of the Northern Pacific Railroad; Seattle, on Elliott Bay, twenty-five miles north of Tocoma, is now the largest town in the Territory. The Territorial University is located here, and under the present management of Professor Anderson is in a very prosperous condition. The situation of the town is very fine and the scenery beautiful. The Northern Pacific Railroad may be built to this point, which will add materially to its prosperity. Mr. Dexter Horton, the leading banker of this city, describes the harbor and shipping facilities of Seattle as unsurpassed on Puget Sound.

Port Townsend, Steilacoom, Kalama, Vancouver, are the other towns of any size in Western Washington. In the eastern part of the Territory Walla Walla is the leading city, and has a most brilliant future, situated as it is in a section of rich grain-producing country. It is destined to be an important business-centre.

The tide of emigration has been setting so strongly to Eastern Washington, and the interest felt in regard to its resources is so great, we append the following from the Walla *Union* in answer to this question from a correspondent: "Give me a general description of the country. Tell me how it is for soil, timber, water, and stone. How is it for health and climate?"

"We answer: Eastern Washington may be generally described as a rolling prairie country. The timber is found principally on the Cascade, Cour d'Alene, and Blue Mountains, with scattered groves of cottonwood, birch, alder, and willow along the streams; and, as a consequence, material is dear. Lumber sells for from twelve dollars per thousand feet at the mills to fifty dollars per thousand feet at the yards, depending on the distance that it has to be hauled. Rails are worth about two dollars and fifty cents per hundred where cut. The soil is more or less alkaline, with a basaltic foundation, which experience has proven to be the best wheat-producing compound.

"The Snake River flows through the country from the Idaho line to its junction with the mighty Columbia, which divides what is known as the Columbia Basin into eastern and western parts. The eastern part, which averages one hundred and twenty miles in width by two hundred in length, is generally well watered, being traversed by numerous small streams having their sources in the Blue and Cour d'Alene Mountains and emptying into the Snake and Columbia Rivers. The bottom-lands on these streams are generally narrow patches, which yield large crops of hay or grain. The hill-lands between the streams are covered with bunch-grass, a very nutritious species, on which cattle keep fat the year round. Experience has demonstrated that where the bunch-grass grows thickest, there the best and largest crops of wheat can be raised. Fully one half of the eastern part of the basin is 'plough-land.' As a rule the Columbia and Snake Rivers flow through deep rocky cañons. Only at few and irregular intervals along them are there to be found bottom-lands of sufficient area to make farms.

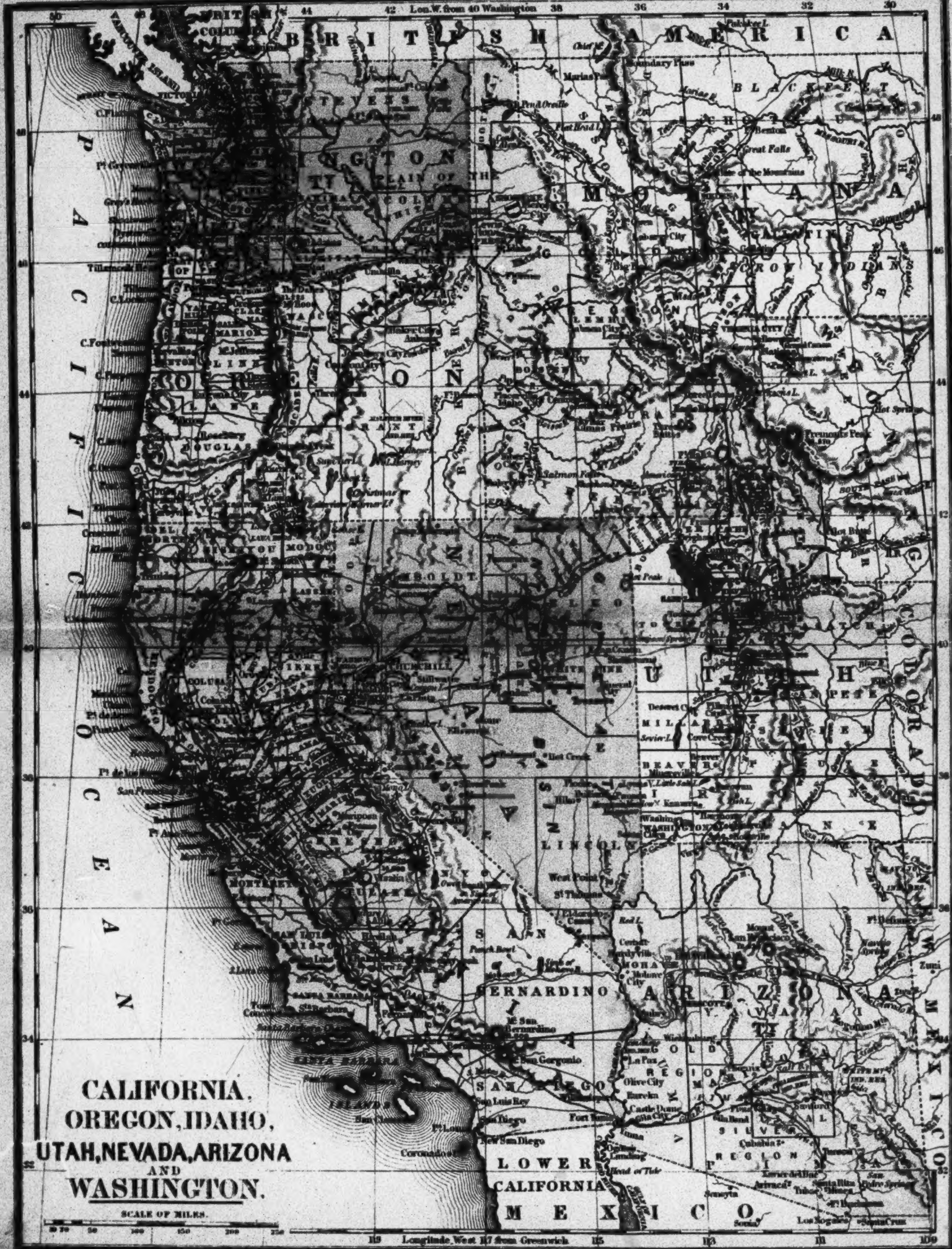
"The western part of the Columbia Basin, which is about seventy miles broad and two hundred long, is not so well watered as the eastern portion. A few streams rise in the Cascade Mountains and empty into the Yakima River, which in turn empties into the Columbia. The character of the soil is very similar to that of the eastern portion. The major and best part of the western portion of the Columbia Basin is occupied as Indian reservations. Timber is more plentiful in the western than in the eastern portion of the basin.

"The man who starts for this country expecting to pick up anywhere a farm embracing both timber and prairie lands will be sadly disappointed, while the man wanting a prairie farm yielding an average yearly product of twenty-five bushels of wheat per acre, with other grain (save corn) in like proportion, will, by a very little effort, find what he wants. In this connection it is well to state that the average yield of wheat in that part of the Columbia Basin known as the Walla Walla country was, during the past harvest, thirty-three bushels per acre.

"Only a very small fraction of the lands in the Columbia Basin has been taken up by actual settlers. Over half of it is included in the limits of the grant to the Northern Pacific Railroad Company. This company has now several hundred men at work, building its road from the mouth of Snake River to Lake Pen d'Oreille, through the heart of the eastern portion of the Columbia Basin, while the Oregon Railway and Navigation Company is now operating a road in the Walla Walla Valley, and making the survey for several other lines.

"The Northern Pacific Railroad Company sells its land, the odd sections, for two dollars and fifty cents per acre cash, or four dollars per acre on four years' time, with interest at seven per cent. per annum on deferred payments. The government lands are subject to homestead, pre-emption, and timber-culture entry, such as are inside limits being rated at two dollars and fifty cents per acre.

"The climate of the country east of the Cascades is mild and equable. The summers are never intensely hot, the mercury seldom indicating one hundred degrees in the shade during the day, while the nights are generally cool enough to make a light blanket on the bed a necessity. The days and nights are never sultry and oppressive, as they are in 'the States.' The winters are, as a rule, short. During a residence of fifteen years in Walla Walla Valley we have experienced but one 'hard winter.' That was the winter of 1874–75. That winter commenced in January and lasted until the latter part of February. During November and December of that year the farmers ploughed the ground and sowed grain, and they resumed ploughing and sowing as soon as the snow disappeared in February. The work of ploughing is generally done during every month of the year. As a rule, the mercury during the winters here seldom indicates as great a degree of cold as zero, and hardly ever below it. During our residence several of the winters have been so mild that no ice was put up for summer use. Thousands of cattle, horses, and



CALIFORNIA, OREGON, IDAHO, UTAH, NEVADA, ARIZONA AND WASHINGTON.

sheep are yearly wintered in the Columbia Basin without being fed a pound of hay or grain.

"The great 'saving clause' of this region is what is called the 'Chinook,' a warm wind that blows over the country at irregular intervals during the year, melting the snow and ice in winter and purifying the air in summer. The Chinook is claimed to be a part of the trade-winds, which, blowing up the Pacific coast, diverge up the Columbia through the Cascade Pass. Whencesoever it cometh, it is a most welcome and beneficent visitor.

"The average rainfall during the past seven years has been 15.50 inches. The rain falls mostly between October and May, only a few showers occurring during the summer. Harvest commences when the grain is ready to cut, and is carried on until it is all gathered, without regard to the weather.

"All the fruits usually raised in the temperate zone, including peaches, pears, apples, grapes, and other small fruits, grow luxuriantly on the bunch-grass lands. Orchards are raised with rapidity, peach trees frequently bearing in three years from the seed. Fruit this year 'goes a-begging for a price' in Walla Walla Valley. Some years the fruit-crop, particularly peaches, proves a failure. A failure of the grain-crop has never been recorded in the twenty years this valley has been settled.

"In point of health the Columbia Basin will compare favorably with any other part of the world. The prevailing diseases are colds during the fall, winter, and spring, and the green fruit, watermelon, and kindred complaints during the summer. Many of our medical men engage in farming to make money to live on.

"Wheat is to-day worth sixty cents per bushel; beef-cattle, from fifteen to twenty dollars per head; horses, depending on breed, from five to five thousand dollars each; sheep, from two dollars and fifty cents to fifty dollars per head; hogs are scarce and dear this year; everything in the line of produce is cheap.

"The Columbia Basin, which, besides Eastern Washington, includes a large part of Eastern Oregon, is the best 'poor man's country' in the world. No man, if a worker, need go unemployed. Wages range from twenty dollars a month and board upward, depending on the kind of work and the quality of the worker."

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5

CALIFORNIA.

BY CHARLES G. YALE.

HISTORY.

THERE are yet many persons whose impressions concerning California are as vague as they were years ago, when gold was first discovered within its borders and the whole world was astonished at the seemingly boundless wealth so suddenly uncovered in a region hitherto considered as worthless for the uses of all but those who were willing to live in a state of semi-civilization. To such people the associations of the "early days" are still connected with the name of the State. They think of California as a place where rough men in miner's garb live an out-door life of excitement and turmoil, without any of those refinements of civilization which custom has made necessities; where the revolver and bowie-knife are freely used to settle the most trivial differences of opinion; where a large part of the people live in cabins in mining camps, and divide their time between digging in muddy gulches for gold and drinking and gambling in saloons for amusement; where both necessities and luxuries are sold at exorbitant rates; and where the people indulge in a language interspersed with a miners' slang so choice and unique that long residence is necessary to acquire it. These are the people who acquired their knowledge of California from the magazine and newspaper stories recounting the adventures of the early pioneer miners—stories which sound as strangely to the average Californian of to-day as they do to the man who has never trod the Pacific Slope.

Others, again, associate the State with an idea of magnitude. They think it a place of big trees, big gold-mines, big nuggets, pumpkins, pears, grapes, potatoes; large ranches, large grain crops, large fortunes; high mountains, rates of interest, and wages.

To others, still, California is a region made singular by the many marvellous facts in her history, by the rapid and wonderful development of her resources; by her sudden jump from dependence for supplies on older neighbors to a position where she is looked upon as a source to draw from, exporting wool, hides, lumber, gold, grain, wine, etc. etc. in great quantities; by her rapid increase from a barren Territory to a rich and powerful State, whose products exert an influence in the money-markets of the world—a State with every variety of climate, from Arctic snows on mountain-heights to tropical verdure in the valley-lands, where not only grow the products common to the temperate zone, but many which until California agriculture was developed were not known within the borders of the United States.

To convey a correct impression of a region so large as California, where there is such a variety of climate, resources, soil, scenery, and society, in general terms, is not an easy task. Details of interest to one would be tiresome to another. Even among the many thousands who have passed through the Golden Gate on their entrance to this promised land, and scattered over its length and breadth or settled themselves in the city on the shores of the Pacific, few are thoroughly familiar with the whole State or its resources. Let us pause on the threshold of this magnificent portal and contemplate for a moment the earlier history of a State which surprised the world by the marvellous rapidity with which it sprang from almost nameless obscurity into the zenith of a fame which reached the four corners of the earth; from sterile unproductiveness to unequalled fertility of resources; from barren poverty to unexampled wealth.

It was the famous Sir Francis Drake who, in trying to return to England through a supposed passage by an open sea north of the American continent, first blundered on to the California coast. He did not discover it, but found it in his way. He had sailed from the west coast of South America and Mexico, where he had been on one of his legalized plundering expeditions, and went north until it got too cold. He then turned south, and finally brought up for a time on what is known as Sir Francis Drake's Bay, a semicircular bight behind Point Reyes, about thirteen miles from the Bay of San Francisco. Although he reported having found both gold and silver there, his story is an unlikely one, since neither is found to any extent on the coast, and he made no mention of having gone inland. At a few points on the ocean-beach of the coast gold-bearing sands are found, but silver is not found in placers, and there is not much of it in California anywhere. Drake's visit was in 1579, over three hundred years ago. Some sixteen years after Drake's voyage the Spaniards explored the coast, and also anchored in Drake's Bay; and

Sebastian Vizcaino, after landing south at San Diego and Monterey, came also to the same bay, but, though so near, did not find that of San Francisco.

Nothing came of these voyages for two hundred years, and until 1769 California was left to the Indians and wild animals. In that year a small party of white men came in the brig San Antonio to make permanent settlement, and landed at San Diego, a town on the coast at the southern end of the State. This was the beginning of the Spanish dominion. The settlement was under control of the Franciscan friars, who came with the purpose of converting the Indians. It was a band from this party, under the leadership of Juan Crespi, that came far enough north a few years later and found San Francisco Bay. Junipero Serra, the head of the Franciscan order in California, founded a mission at San Francisco, as he did at all those points which were well adapted for such a purpose.

The first of the missions was established at San Diego in 1769, and the last at Sonoma, north of San Francisco, in 1823. They were mainly placed on the coast or in pleasant valleys near it. The Fathers exercised excellent judgment in the location of their missions, and speedily made a change in the habits of the people in their vicinity.

The Digger Indians, who were the aborigines of the country, were by no means adapted to be brought to a high civilization even by the energetic and enthusiastic endeavors of the Franciscans, who aimed at little above making converts. Their stone arrowheads, mortars, spears, and knives are still found in numerous shell-mounds near the coast, where they formerly had their rancherias. These Indians, peaceful in nature and slothful in habit, soon clustered around the missions. The friars taught them a rude sort of husbandry, converted them, and modified their savage customs. They were taught to build adobe houses, made of bricks fashioned from the peculiar tenacious soil and burned in the sun, tend flocks and herds, cultivate grain, and—what they probably did not want to know—that it was necessary to labor to be of use in the world.

When Mexico declared her independence from Spain in 1822 the Mexican dominion began. This was an era of idleness, laziness, and freedom from the cares of life. The Mexicans obtained large grants of land by asking for them, and lived on the income derived from the hides and tallow of their cattle. The better class had pleasant homes, and the poorer clustered around them. The missions formed nuclei for the few towns. With plenty of horses to ride; plenty of *carne con chile* (beef and red peppers), *frigoles* (beans), and *tortillas* (cakes made from corn-flour);

abundance of leisure; few excitements beyond an occasional bull- or cock-fight; no taxes to pay; no doctors or lawyers, unwelcome telegrams or letters,—these Californians led an easy, happy life. No wonder they looked with disfavor on the arrival of the *gringos*, who came in swarms, invaded their territory, brought the evils of civilization in the shape of a restless multitude eager to disturb existing conditions—a race destined, as they saw, to supplant the owners of the soil.

The Americans began to come in noticeable numbers in 1846, and it was then, with the view of extending the American domain on the Pacific, that the steps were taken which finally brought California into the possession of the United States.

It was the discovery of gold which awoke California from her lethargic sleep of centuries, which destroyed the last hope of the Mexicans of maintaining their habits and customs in the face of the change of ownership, and which filled the newly-acquired territory with an eager treasure-seeking multitude who were the pioneers and founders of the State.

The history of this era has been told in song and story. The recital is stale. The incidents which transpired during the first few years of what are known as the "pioneer days" of California have furnished material for the historian, the poet, the novelist, the preacher, and all who put pen to paper. It was an area of boundless prosperity far beyond what was ever dreamed of by those who participated in its events. The romance of the period has been dealt with by abler pens; it is only with the material results we have to do.

As soon as the gold discovery became known as a certainty on the Atlantic side of the continent, an unorganized army, with its ranks scattered on sea and land, came to take possession of the modern Ophir and despoil it of its treasures. In 1849 over forty thousand people made a weary march across the continent, and as many more braved the dangers of the deep, to reach the coveted goal. A voyage of six months' duration, or a tramp of even longer time, deterred them not. The perils of Cape Horn, the fevers of the Isthmus, and the scalping-knife of the Indian were ignored. The bright anticipations of a sure reward for toil, the dream of boundless wealth, the enthusiasm of conviction of success, lessened the hardships of these adventurous bands and buoyed them with a hope which surmounted all obstacles.

These were the pioneers who laid the foundation of the California of to-day. To those of them still living—and there are many—the altered condition of affairs is not as satisfactory as one might suppose. They have been unable to adapt themselves to the changes necessarily brought about by the decadence of the gold-mines, the increase of population, the levelling of business affairs with those of more settled communities, the competition in trade, and the more sober and monotonous course of life consequent upon the new order of things. Money is no longer so plenty or so freely lavished as of old. Opportunities for making fortunes without labor are not frequent. Work is not paid for so well as it used to be. Individual effort must be exerted for a living, and people are more plenty than places in the cities.

In fact, California, from being an isolated, independent State, has come to be one as dependent to a certain extent on its neighbors as the older States are. The transcontinental railroads have brought it down to the business level of older settled communities. San Francisco can no longer dictate terms to the whole coast. The merchants must sell as cheap as in other markets, or the purchasers go elsewhere. Formerly they had no choice.

The bane of California has been a centripetal tendency to gravitate to *the* city. A great city has been built at the expense of smaller ones and of the country. There are few prosperous towns and villages in California. San Francisco has controlled the trade so long and so determinedly that her smaller rivals have been driven to the wall. All this is now, however, undergoing a change; but the metropolis of the State feels this change sorely, and is restive under it. It will be better for her in the end when a settled population fills the valleys and hills, builds up small towns and villages, cultivates the soil, develops the material resources, and abandons thoughts of city life entirely. Then will San Francisco—and California—be prosperous again, and it will be a prosperity more enduring than that which has tended to create a metropolis to the detriment of the surrounding region.

Values have been too high in California for many years to encourage the class of population she needs. Farming lands have been held at prices far beyond their real value when the expenses of cultivation, freight, and interest are compared with the resultant yields. This has been due to the high rates of interest for money—now modified, however. When all these things reach their proper level, as they are now doing, prosperity will reign again.

Another thing which has been ignored in California has been home manufactures. Very little money comparatively has been put into manufacturing enterprises. Aside from a rolling-mill, half a dozen foundries, a woollen-mill or two, a few furniture-factories, etc., in San Francisco the home industries of this character are not many; in the interior of the State they are very scarce. A few paper-mills, powder-mills, tanneries, etc. are here and there found, but no large manufacturing establishments attract the attention of the stranger. Even where the raw material is produced in abundance it is shipped away, and the manufactured product purchased back, the profit of the manufacture going to other States. The rich men, speaking generally, have been lenders of money, and have not paid that attention to the establishment of productive home industries which would have added to the material interests of the State. To tell the truth, they have met with little encouragement where they did, as the people, with an inexcusable perversity, seem to consider it the correct thing to prefer the imported to the homemade article, whatever it may be, and the local manufactures languish.

The excuse given for the non-establishment of these much-needed home industries is that labor is too high. No doubt it has been, as has everything else in California. It must now come down with rents, interest, and values; and it is a reluctance to do this, combined with that desire to live in the cities before mentioned, which, in connection with the Chinese question, has brought about the labor agitation in San Francisco which has attracted so much attention from its communistic tendencies.

IRRIGATION.

The peculiarity of the climate of the State is in its wet and dry seasons, the summers being entirely rainless. Moreover, there is no dependence to be placed on the amount of rain in the winter months, more especially in the southern part of the State, where "dry years" are more frequent than pleasant. The rains fall from November to April more or less, but from May to November there are none. With sixty inches of rain on the mountains to the north, there may be only six inches in the southern part of the State. The rainless summers offer every facility for gathering the crops, since everything may be left out of cover if desired. No snow falls along the coast or in the great central valleys. In these valleys, although very hot at noon in summer, the mornings and nights are usually cool. The air is so dry, however, that with the thermometer frequently at 100° to 115° no cases of sunstroke occur. The heavy fogs brought in by the strong summer afternoon breezes from the Pacific Ocean are features of the coast climate, but not pleasant ones. The climate in different parts of the State varies so very greatly that choice of any may be taken at pleasure.

Without attempting to enumerate those features of California agriculture in detail which would interest the farmer only, some of its conditions may be considered by the general reader worthy of note. Among these is the subject of irrigation, attention to which has been forced upon the farmers of certain parts of the State where the rainfall is small and uncertain; and its importance is such that the State, and even the Federal, government has been called upon to report on the feasibility of general systems for the benefit of all.

The introduction of irrigation into California as an aid to extensive agricultural operations is of very recent origin. The Jesuit Fathers, who established their missions in the southern portions of the State more than a century ago, made the first beginnings in this direction, but their operations were limited in extent, and confined chiefly to the watering of vineyards, gardens, and orchards in the immediate neighborhood of the missions. Although the art has been continually in practice in the counties of Los Angeles, San Bernardino, San Diego, and Santa Barbara to more or less extent ever since, but little progress was made until the occupation of the country by Americans, while farther north irrigation dates back scarcely twenty years, and it is only within the past decade that capital has become largely engaged in the construction of any important works for that purpose. It may be safely said that the area of irrigated lands in the State has doubled in ten years, and at this time a more general appreciation of its value and importance is entertained than ever before.

Irrigation being, then, such a novelty, it is not to be wondered at that, however great its necessity, its progress has been slow. Farmers who had been accustomed to the methods of agriculture pursued in the Eastern and Southern States, where irrigation is scarcely known, naturally entertained a prejudice against a system of which they were totally ignorant, and avoided those sections of the State where the rainfall was not generally sufficient to produce crops without the artificial application of water. It has not only caused the achievement of much decided success in the use of water, but has led to the partial removal of the prejudice which still exists in the minds of many residing in those more favored localities where cereal crops at least seldom fail for lack of rain.

Those who have acted as pioneers in the introduction of irrigation have labored under many discouragements, and have acquired their experience dearly. They have had to learn the best methods of preparing their land for the reception of water, the proper seasons for its application, and the quantity required to produce crops. Many mistakes were made, the most common one being that of using excessive quantities of water, resulting in injury both to land and crops—a fault which, it may be said, is still a most difficult one to correct. Inattention to drainage too has in many instances resulted in engendering sickness, which, being attributed to irrigation alone, has not increased the popularity of the new auxiliary to agriculture.

One prominent defect in the system which has grown up in California is the lack of any sort of governmental supervision of the division and distribution of the water of the streams among the irrigators. A law was enacted in 1873 permitting any one to appropriate water on filing a claim in the records of the county wherein the appropriation was to be made; but the terms in which the volume of such claims were to be expressed were exceedingly indefinite, and prior claims existing before the passage of this law were wholly undefined. This state of things has naturally led to much confusion, wrangling, and litigation over the possession of the waters of a stream in seasons of scarcity, and the State Legislature was appealed to for the readjustment of the whole matter of water-rights on a permanent basis, and to exercise its power in effecting an equitable distribution of the precious element. Many have thought it expedient for the State government to follow the example of the government of India—take possession of the waters of her streams and construct a comprehensive system of canals for the irrigation of all the arid lands within her borders. But prior to taking any such radical measures the Legislature of 1877–78 merely resolved to order a scientific investigation of the whole subject. The office of State Engineer was created; his duties were to examine and report upon not only the problems of irrigation, but those of the drainage of the valleys, improvement of river-navigation, and the disposal of the detritus resulting from hydraulic mining,—all of which are questions of serious import to the welfare of the State.

The first report of the State Engineer, giving the results of the first two years' investigation, has just been published, and it contains a large amount of valuable information which has long been needed.

There are certain regions in California where, by reason of a deficiency in rainfall, irrigation is absolutely necessary to the production of any kind of crops. In other sections, where the winter precipitation is copious, artificial watering is only resorted to for the production of summer crops, meadows, gardens, and orchards during the season when all parts of the State are alike parched and devoid of moisture. In the one case, therefore, irrigation is a matter of the most vital importance; in the other, it is one of convenience, and is practised as supplementary to the other types of agriculture nourished by natural moisture.

Although irrigation is practised to greater or less extent throughout

California, from Siskiyou on the extreme north to San Diego on the southern border, and in many nooks and corners from the sea-coast to the eastern limits of the State, the locality where it has received the most attention, and where it is destined to become most extensively developed in the future, is in the great interior basin of the State.

This great valley, having an extreme length of four hundred and fifty miles and an average width of nearly forty miles, forms a marked geographical feature of the Pacific coast. It lies hemmed in between two ranges of mountains—the Coast Range and the Sierra Nevada—which join together at its northern and its southern limits. It consists of gently-sloping, nearly level plains, drained by two rivers—the Sacramento and the San Joaquin—which unite and seek a common outlet through San Francisco Bay to the sea.

The total area is over ten million acres, a large proportion of which is arable land. The area of the mountains and foot-hills drained by its streams is nearly twenty-six million acres. The rainfall over this section of the State diminishes from north to south, until in the extreme southern portion of Kern county it rarely exceeds six inches per annum, and is sometimes less than two. From a point fifty to seventy-five miles south of Stockton to the southern extremity of the valley it may be said that three years out of five cereal crops cannot be produced without irrigation, and of course summer crops are out of the question in all seasons unless artificially watered.

It is in this section of the State, therefore, comprising the counties of Kern, Tulare, Fresno, and Merced, that irrigation-works have been most generally constructed and the practice of the art become most general as auxiliary to extensive agricultural operations. In some of the more southern counties outside of the boundaries of the above-described valley irrigation is also practised in isolated localities, and there are large tracts which will never be of much value until systems of irrigation are devised for them.

The major portion of the lands to be irrigated in the San Joaquin Valley lie upon the eastern side of the median trough which intersects it longitudinally and forms its line of drainage, while its water-supply, upon which irrigation must depend, comes almost wholly from the Sierra Nevada Mountains on the east in a series of perennial and intermittent streams, which descend to the plains in parallel lines, and after crossing the valley turn northward and find an outlet in the San Joaquin River. The more important of these streams, named in their order from north to south, are the following:

Name of River.	Mountain drainage-area, square miles.
Kern	2382
Tule	446
Kaweah	608
King's	1885
San Joaquin	1630
Fresno	260
Chowchilla	303
Merced	1075
Tuolumne	1513
Stanislaus	971

The discharge of these streams is extremely variable, but as most of them are snow-fed, rising in the ice-fields of the high sierra, they carry the greatest volumes during the months of March, April, May, June, and July, when the water is most needed for irrigation. Their flow is not proportional to the area which they drain, but is dependent more upon their geographical position, those farthest north having the greatest discharge per square mile of mountain-watershed, for the reason before stated, that the precipitation increases from south to north over all sections of the State. In extreme floods the larger streams maintain a discharge of thirty to forty thousand cubic feet per second for several weeks, while in low water in October the greatest of them do not exceed two hundred and seventy-five cubic feet per second in volume. The area of irrigable land adjacent to these streams is estimated by the State Engineer at two million four hundred and forty-five thousand acres, while a large percentage of the total area of the valley is not well adapted to irrigation and cannot be considered in any sense irrigable.

That the field for further development of irrigation in this vast territory is a great one can best be seen by comparing the area under irrigation with that yet unwatered. The entire irrigated area of the east side of the San Joaquin Valley aggregates but one hundred and forty-five thousand acres—scarcely one per cent. of the area susceptible of irrigation—distributed as follows: Kern River, 30,800 acres; Tule River, 4000; Kaweah River, 22,000; King's River, 61,200; Fresno, 3000; San Joaquin, 14,400; Merced, 1600 acres. On the west side of the valley about forty thousand acres, all told, are irrigated from the San Joaquin River. The irrigation-canals and ditches derived from these streams may be enumerated as follows: Kern River, 32; aggregate length, 275 miles; total cost of main works, $849,000. Tule River, 12 canals, all small. Kaweah River, 14. King's River, 15; total length, 230 miles; total cost, about $500,000. Fresno River, 1. San Joaquin River, 2 canals and 2 natural sloughs used as artificial channels; total length, 110 miles; total cost, $1,350,000. These constitute the principal works, although a number of others are in a state of partial completion.

The works thus far constructed are generally of an excellent order, if the circumstances upon which they were undertaken are considered, but the European engineer, accustomed to the more elaborate and costly canals of France, Spain, and Italy, would doubtless be struck with the entire absence of stone masonry in all the structures connected with them. The timber head-gates, dams, regulating-sluices, outlet-gates, etc. have a temporary appearance which characterizes all works of irrigation in California, where economy in first cost must be rigidly studied. Some of the canals are models of engineering-work in many respects, as, for example, the Calloway Canal, which is derived from the Kern River and extends northward upon the plains a distance of thirty miles, having a maximum capacity of five to six hundred cubic feet per second. Its cost was less than two thousand seven hundred dollars per mile. It is expected to irrigate one hundred thousand acres, and is one of the largest canals in the State, there being but one other larger of those in use for irrigation —the San Joaquin and King's River Canal, deriving water from the San Joaquin River on the west side of the valley. This canal has a capacity of seven hundred and twenty cubic feet per second, and a length of sixty-seven miles, cost nearly twenty thousand dollars per mile, and has proved an unfortunate investment to its stockholders.

A great deal of the land in the southern part of the State, though rich enough as far as soil is concerned, is practically valueless unless it can be irrigated. The lands in districts where irrigation systems are in vogue command comparatively high prices, and those where systems can be applied are also held at much higher prices than those where it is out of the question. There are a number of "irrigated colonies" in the southern counties, and in every one of them is a prosperous community. The irrigated land does not only produce in every instance large crops, but several in a season if desired. Speaking generally, those sections where irrigation is practised are divided up into smaller ranches, and the work is more carefully conducted, than on the large unirrigated farms.

In favorable seasons most abundant crops can be raised on any of this land without irrigation, but this cannot be counted on as a certainty without the artificial introduction of water.

The lack of rain in the southern part of California and the uncertainty of crops have injured that portion of the State. The stories about the oranges, lemons, olives, vines, figs, etc., etc., and semi-tropical climate, have been very much exaggerated. There are certain portions of the southern country which are most fruitful and in which all these things will thrive, but it is not by any means the case with all of it. The intending immigrant will do well to see the ground personally and examine the surroundings before bargaining to purchase. The tide of immigration to California no longer flows steadily to the southward: too many have gone there and failed. The lands which are subject to irrigation are held too high, and a great deal of the rest would be expensive as a gift. The habit of the people of those sections of country in lauding them to the skies, exaggerating their fruitfulness and value, has reacted, and within a year or two the southern country has had few accessions to its population.

There are many tracts under a high state of cultivation, and irrigated, where the people are prosperous and thriving. The leading towns in Southern California and the most prosperous communities are those where systems of irrigation have been introduced. In fact, in most of those parts of the State irrigation is a necessity to *ensure* annual crops. Some of the "colonies"—like that of Riverside, for instance—have by irrigation outstripped in a few years' existence, in population and material prosperity, places which have been growing for years.

A full consideration of the subject of irrigation in its various bearings would be superfluous here, even were the writer competent to undertake it; and this much only has been said because it is a branch of agricultural pursuits little considered in other parts of the United States and peculiar to California.

In some places, where there are no streams to furnish water for irrigation, artesian wells have been bored, and where they overflow the water is thus readily obtainable. When the water only rises to near the surface windmills are used to raise it. There are three or four hundred of these wells in Los Angeles county, several hundred in Santa Clara county, and many in Fresno, Monterey, San Bernardino, Tulare, and Kern counties. The utility of these bored wells is now universally recognized, and they are every year becoming more numerous.

In peculiar contrast to the dry lands needing water to be rendered available for purposes of agriculture are the tule-lands of California, from which the water must be removed before they can be utilized. This branch of agriculture, too, is to a certain extent peculiar to California, and some little detail concerning it will be found of interest.

TULE-LANDS.

In the year 1871 a company of Kentucky farmers raised a crop of wheat on one of the tule-islands in the San Joaquin River in California. The crop was taken from one thousand acres, and the value of it was over fifty thousand dollars. The price paid for the land, with a levee built around it, was twenty dollars per acre. The grain was planted without plough or harrow. The seed was sown upon the ashes of the burnt sod and vegetation, and tramped in by sheep driven in a band over the land. The wonderful success of this crop and the easy and novel method of cultivation at once brought these lands into notoriety, not only in California, but also in the Eastern States, particularly in Kentucky, and large schemes of reclamation were projected and begun, the issue of which forms a chapter of California history still unfinished.

The tule-lands are swamp- or marsh-lands, and derive their name from a tall round rush that abounds on them called *tule* (pronounced *too-ly*) by the Indians. The tule is a fresh-water plant, and the term belongs properly only to the fresh-water swamp-lands, but is also sometimes applied to the salt marsh-lands by those not familiar with the subject.

There are two classes of swamp-lands upon which the tule grows—viz. fresh-water swamp- and fresh-water tide-lands. These, with the salt marsh-lands, comprise the three varieties of land designated by the laws of the State as "swamp and overflowed lands." All lands of this character were granted to the several States by act of Congress of 1850, known as the "Arkansas Act." The title is therefore vested in the State, and each State may dispose of the land under its own laws. The State of California has heretofore issued a patent in fee for all lands of this class upon payment of one dollar per acre in full, or upon full reclamation of the land, or upon expenditure of two dollars per acre in reclaiming any district.

Reclamation districts are set apart by the boards of supervisors of the county in which the land lies, upon the petition of the owners of more than one-half of any tract of swamp and overflowed land capable of this mode of reclamation. When the ground has been reclaimed or the two dollars expended in reclamation, all moneys paid to the State in purchase of the land are refunded to the land-owner, the policy of the State being to give the land to any person reclaiming it. The law of 1868 permitted the purchase of this character of land in any quantity, and in consequence all of it, excepting in isolated and unknown tracts, was taken up by speculators, and since then the minimum price for swamp-lands unreclaimed has been five dollars per acre. The late act of the Legislature, fixing six hundred and forty acres of land as the largest amount which a purchaser could buy of the State, came too late to reserve these lands for small holdings.

The unlimited-purchase act was undoubtedly dictated by true wisdom, as only large capital and concentrated management can effectually handle the lands. There are in California, according to the last report of the Surveyor-General, 1,825,000 acres of swamp and overflowed land, including the salt marsh-lands. All is susceptible of reclamation, and every acre is suitable to some crop or product capable of sustaining life. The fresh-water swamp-lands comprise the largest proportion of these. They lie on the margins of the rivers and lakes above the influence of the tides, and are subject to sudden inundation by floods caused by winter rains. They receive the first and heaviest deposit of sediment borne down by the floods, and the soil is composed of various amounts and strata of clay, sand, and loam, and is exceedingly rich. The almost exclusive growth is the tule, which when young and tender furnishes excellent grazing for live-stock, and the lands are constantly resorted to for pasture by the owners of the contiguous upland in the fall, when the dry weather has destroyed the vegetation of the higher lands and evaporated the water that had till then lain on the marsh.

The great bodies of this class of tule-land are found on the borders of Tulare Lake and the adjacent lakes in Kern and Tulare counties, and along the Sacramento River and its branches in Yuba, Sutter, Colusa, and Yolo counties. A considerable quantity lies also along the San Joaquin River and its tributaries, and the tule-land in the mountain-counties adds somewhat to the gross acreage.

This class gradually merges below Sacramento City on the north and Stockton on the east into the fresh-water tide-lands. There are about four hundred thousand acres of these lands lying in the delta of the San Joaquin and Sacramento Rivers, where the fresh water of the rivers is checked in its flow and rises and falls with the oscillations of the salt water from the Bay of San Francisco and ocean below, acting as a tidal dam. The soil is largely peat, derived from the luxurious growth of tules, lilies, grass, and ferns, which spring up, flourish, fall, and decay, and make a bed for the future plants of the same kind. There are large tracts of this vegetable mould thirty, and even forty, feet deep, interlayered with occasional strata of sedimentary deposit. The tides rise and fall from four to six feet, and high tide usually covers the surface, thus rendering the land ordinarily useless even for pasturage, for which the clover (a red species) and other plants abounding on it are well adapted. In very dry years the tidal overflow has been so much as to permit grazing, and these lands have proved a refuge to cattle of the dried-up plains on more than one occasion.

As the two classes of land described merge into one another, so likewise, from the nature of the case, the fresh-water tide-lands gradually become more and more salty until the salt marsh-lands are reached. The marsh-lands of Suisun Bay are mostly brackish, but true salt marsh-lands are confined to San Pablo and San Francisco Bays. The latter aggregate about one hundred thousand acres, and the brackish lands of Suisun Bay amount to about sixty-five thousand acres more. Peat appears largely as a constituent of the salt marsh-lands also, but in smaller proportions, as the natural growth from which it is derived is scanty compared with the rankness of the tule vegetation. The principal grasses are a salt-grass, a hollow, short-jointed plant, and a wire-grass, so called from its wire-like stalk. Both are short, not growing over two feet high, and are of small value for pasturage. Cattle appear to like them as a change from the dry feeding of neighboring uplands or for their salt, and in case of necessity live-stock may subsist upon them for a while if they have not become too old and tough.

The sedimentary deposits in salt-marshes are much larger than in the tule-lands, so that they are more solid and have a higher elevation—generally about one foot above high tide.

The reclamation of swamp-lands was at first thought to be an easy matter, and it was only after repeated failure and heavy loss that the difficulties began to be appreciated. Formerly, any farmer considered himself capable of reclaiming any district of swamp-land; now the subject receives the deepest consideration of boards of engineers and the Legislature of the State. The operations of the hydraulic miner; every cubic yard of tailings emptied into the remotest stream that joins the waters flowing to the bay; every furrow turned on either watershed of the two great valleys of the State; every tree planted or cut down; each season's snow or rainfall, and the more immediate questions of depth and width and carrying capacity of the stream to be leveed against; the character of the foundations and embankment and the cost of construction,—all these and more are factors in the problem.

But as the extent of the undertaking is developed the increasing value and importance of these lands renders them capable of supporting the investigation and removal of each and every obstacle as it presents itself.

The salt marsh-lands, having the best material for levees and subject only to overflow of the tides, can be reclaimed with the least difficulty and expense. But, as the soil is saline and cannot be immediately cultivated, fewer attempts at reclamation have been made than on the tule-lands.

SCENES IN THE YOSEMITE VALLEY.
1.—Bridal Veil Fall. 2.—Mirror Lake.

Of the latter the greatest amount of work and capital has been expended on the fresh-water tide-lands; but large sums have also been spent upon the fresh-water swamp-lands, especially on those magnificent tracts of the finest alluvial soil in the world extending along both sides of the Sacramento River northward from Sacramento City.

These rich, loamy lands, spreading in broad acres of level, unbroken surface, affording before reclamation much pasture for sheep and cattle in the latter months of summer as the water disappears, and, when cultivated, yielding readily to the plough, and from the start producing large crops of grain, are attractive enough to encourage the outlay of their full value to rescue them from the domain of the floods. Lands of this class can be generally reclaimed in bodies of thousands, and even of hundreds of thousands, of acres; and, though the floods be severe and embankments large, yet the cost per acre for reclamation is reduced by the vast size of the district included.

It was originally supposed that of all the swamp-lands the fresh-water tide-lands could be the most cheaply and easily reclaimed. The tides barely rose above the level of the land, and a small embankment would apparently keep them out. A flood might come occasionally and spread over all, but it would quickly drain off, so that the damage might not be great and the benefit might not be inconsiderable. Proceeding on such views, the owners of an island of ten thousand acres actually undertook to reclaim it with a single furrow of a twenty-four-inch plough drawn by oxen. For some time a levee of twelve feet base and four feet high was deemed most ample by those holding the most advanced ideas. Peat, abounding so largely in the soil, proved to be unreliable in the levee and treacherous in the foundation. It dried and floated from the levee, and split in subterranean cracks beneath it; and the swamp-land engineer discovered that he must provide an embankment that would not only keep out the water above the surface, but would also have weight sufficient to compact thirty feet of slushy subsoil.

Fortunately for the temporary advantage of the reclamation schemes, the banks of all the streams had a stratum of a foot or more of sedimentary loam, which, laid upon the peat, gave solidity to the levee. The scarcity of earthy matter above the water in many parts of the tule-land is calling into use more and more each year dredging-machines of various kinds. The dipper dredge, the clam-shell, and the sand-pump are all at the present writing at work there. Excellent material in abundance is found in all the watercourses, and the dredges can raise it economically. But no satisfactory method has yet been introduced of transferring the earth at a reasonable cost to the levees across soft mud-flats and over irregular distances from the dredge-pits.

The main reliance for levee-building on all the swamp-lands has been upon the Chinaman. His tools are the shovel and wheelbarrow on the loamy soils of the upper tule-lands, and on the tide-lands he employs, in addition to these, an iron spade or knife, called a "tule-knife," and a fork, with which to cut and handle the peaty sods. The Chinamen live in tents and work in gangs of ten to twenty-five men each. Every man has his part, from cook to boss, and accounts are duly kept by them of all receipts and expenditures.

The Chinese labor averages about ten cents per cubic yard, commonly measured in the excavation, in all classes of swamp-land, but varies according to the nature of the work and distance of moving the earth. Scraper-work is slightly, and dredge-work considerably, higher in price, but the respective results obtained are proportionately superior in effectiveness.

The cost of reclamation per acre varies as much as the number of districts. The uniformity of the conditions on the salt-marsh precludes much difference there. Ten dollars per acre may be set as a maximum figure, while the best reclaimed tract—one of thirteen hundred acres—cost less than five dollars per acre under very able and experienced management.

A wide range occurs upon the tule-lands. A large island of about sixty thousand acres, which was well leveed at the outset with a large embankment that withstood the high waters of February, 1878, when almost every other district was inundated, cost ten dollars per acre for its reclamation. There are tracts which, having suffered from disastrous overflows, show an expenditure on their embankments of several multiples of ten dollars per acre.

An absolute reclamation has not yet been reached on any of the tule-lands. There is grave doubt whether any levee as now built is proof against such a flood as occurred in 1862; and as long as the tailings of the hydraulic mines continue to fill up the channels of the rivers, the flood-mark will yearly rise higher until each stream will burst its banks and change its course entirely. The interests involved are, however, too vast to allow such a catastrophe, and at this present moment the best engineering talent in the State, under direction of the Legislature, is engaged in maturing plans of reclamation and drainage.

Swamp-lands duly reclaimed have been always held in high estimation by agricultural people. To a State like California, subject to recurring seasons of drought, and with a limited rainy season at all times, the resources of her swamp-lands, as in this case so eligibly located as well as productive, are susceptible of a development not possible under the ordinary climates of the temperate zone.

Thus far, the cultivation of these lands in California has suffered through inexperience of the farmer and imperfection of reclamation, and, in consequence, the results are fragmentary. The fresh-water tide-lands have undoubtedly a great advantage over the other classes in the fact that daily and cheap irrigation can be had. By this means two, and even three, crops may be raised, and hay cut three or four times each season. The same tide by its flow and ebb permits the land to be flooded and thoroughly drained, fulfilling without cost the two most important conditions of the growth of plants. For that reason the range—and especially the certainty—of crops will continue to be far greater upon the fresh-water swamp-lands until irrigating-ditches supplement the levees of those richer lands. The latter, when the water is embanked from them, are reduced to the circumstances of the adjoining plains, excelling them, indeed, in fertility of soil, but liable to the same contingencies of rainfall. But the fertility of either is beyond any question.

The productiveness of the salt marsh-lands has been almost as satisfactorily demonstrated. The sedimentary deposits are the same as on the tule-lands, and the organic mould is similar; hence, to get a like fertility it is necessary only to eradicate the salty substances. This is done the more quickly in proportion to the quantity of fresh water put upon the soil, either by the rainfall, by flooding from the frequent creeks that empty into the bay, or from artesian wells in which flowing water has been obtained at a depth of from one hundred and fifty to two hundred and thirty feet. The land may be ploughed after the first rains following reclamation, and a crop of barley or wheat for grain or hay raised the second season. Thereafter, as the soil sweetens, the whole catalogue of farm produce is open to the profitable selection of the farmer.

There are connected with all classes of swamp-lands, as might be expected, difficulties in cultivation peculiar to each. The salt marshes have permeating them many sloughs or small deep creeks, whose smaller branches extend in every direction, and the soil in drying after the water is shut off shrinks and cracks to a depth often of several feet. The first cost of breaking the land is considerably increased in filling the small sloughs and fissures for the plough.

The soil of the fresh-water tide-lands, being peaty and light, is also boggy; and until it is well compacted by a season or two of cultivation without overflow, that they may not mire the horses have their hind feet shod with tule-shoes, which are the common horseshoes having an encircling ring attached to broaden the tread.

The sod on all these lands is very tenacious and hard to pulverize. In many instances it is little less tender than a mat of hair, and there is a kind called "buckskin." Happily, the worst kinds can be subdued by fire. When it was discovered that the turf would burn on the tule tide-lands, large areas were burned over, and in the ashes were raised those large crops planted with sheep, already mentioned, that brought these lands into such prominent notice. Fires set on the ground could not be controlled, but burned to such a depth—not uncommonly two, three, or four feet—that the land was permanently injured, so that now many who still resort to burning first plough the turf and set fire to the furrows only. But the plough and harrow are generally preferred for reducing the sod, because, though slower in the process, they do the least injury and accomplish the best ultimate result.

After two or three years' thorough cultivation the soil of either marsh- or tule-land becomes as light, friable, and easily worked as any garden mould, and yields both pleasure and large returns to the farmer.

The list of the products that have already been raised upon the tule-lands is a large one. Mr. L. C. McAffee of San Francisco, a gentleman of large experience in these lands, enumerates wheat, barley, oats, Indian corn, buckwheat, broom corn, timothy, alfalfa, and other clovers and grasses, potatoes, onions, squashes, beans, sugar-beets, flax, grapes, peaches, apricots, pears, apples, figs, melons, all the small fruits, especially blackberries and strawberries; in fact, hardly any product of the American farm is absent. The borders of most of the streams are covered with a heavy growth of alder, willow, and sycamore, and oaks are found on higher banks. After reclamation willows and alders spring up spontaneously everywhere, and become a nuisance unless kept under. The poplar, locust, eucalyptus, and other trees suitable for firewood, fencing, and other useful purposes have been successfully introduced.

Of the several representative crops to which the most attention has been given, wheat has returned twenty-nine and thirty bushels per acre as the average of large fields in different localities, and measurements of specially good but limited areas have shown seventy-seven and one-third, fifty-eight and one-half, and forty-five bushels per acre. Wheat has been peculiarly liable to rust on the spongy tule-lands where out of reach of the summer trade-winds, though it is still a question among tule-farmers whether proper cultivation and early sowing will not obviate the trouble. Barley has always been a safe and extensive crop. The range of authentic averages runs from twenty-five to forty-five bushels per acre, but exceptional yields of one hundred and five bushels per acre are reported. Timothy has produced four and a half tons per acre, and alfalfa six to eight tons. Potatoes have yielded so largely that for two or three seasons past the farmer, on account of the excessive supply, has been brought into debt by his crop. Five hundred bushels per acre from one crop have been gathered, and two hundred bushels from the early and late crops is considered an unfailing average.

Other crops have made similar returns, and it has been quite universally the case that when the tule-farmers have generally raised vegetables or any article of local consumption the market is certainly overstocked. When it is remembered that the tule tide-lands not only produce, in common with all the swamp-lands, the large crops mentioned, but may also produce two of them, as grain and alfalfa, or grain and beans or potatoes, or other variations, the same season, and with no deterioration of soil that may not be remedied by judicious flooding when the streams are laden with fertile sediment, the great value of these lands will be apparent, and the persistence of the owners in works of reclamation in the face of repeated disaster will be understood.

A large production does not alone determine the value of the land. Accessibility to a market is quite as essential; and this the tide-lands, both salt and fresh, all lying within one hundred miles of San Francisco, possess in an eminent degree. They are interlaced with rivers and sloughs, so that there need not be a farm without water-frontage. The streams are deep and navigable for vessels of any size required for the business. Both sail and steam are employed, and neither the winds of heaven nor the open rivers of the State can be monopolized; they are free to all, and freights and passage will always be cheap for the residents of tide-lands. One dollar per ton for freight, and the same for passage, to San Francisco, are the charges below Stockton and Sacramento. Above these points, as the depth of water in the rivers decreases, the charges are higher. The Sacramento River is navigable to Chico Landing, three hundred miles north from San Francisco, giving water-transportation for the entire year throughout the whole length of the swamp-lands, and competing with the two railroads for the traffic of the Sacramento Valley. In the San Joaquin Valley steamers can reach Miller's Landing, three hundred and fifty miles from San Francisco, for a few weeks only during high water in the spring, or for two or three months at most in very wet seasons, so that the swamp-lands on the upper San Joaquin, south of Stockton, must depend mainly on railroads for transportation. The maximum freight on either river in no case exceeds four dollars per ton from the places named to Sacramento. The Southern Pacific Railroad charges six dollars per ton for grain from the neighborhood of Tulare and Kern Lakes, which have no navigable outlet. The price of wheat in San Francisco is usually the same as the price at London, less ocean-freight, which varies from ten to twenty dollars per ton.

Neither the tule- nor salt marsh-lands are yet considered desirable for residence. The danger of overflow, the presence of mosquitos, and the possibility of fever and ague—which is largely counteracted by the trade-winds on and near the bays—do not encourage the building of homes. But such things are always incident to a new country, and, as the people add to their wealth, they pay stricter attention to the laws of health and increase in every way their comfort and the beauty of their surroundings.

The climate of the swamp-lands shares the changes of the country about them. The temperature ranges slightly lower on account of the large water-surface exposed to evaporation, by which cooler breezes are created in summer and heavier frosts in winter. The thermometer in the Sacramento and San Joaquin Valleys fluctuates more widely and stands at a higher mean than at the Golden Gate. It rarely falls below the freezing-point, but in the valleys it frequently rises above 100° Fahrenheit. The delightful annual mean temperature of the valleys is about 63° Fahrenheit, and at San Francisco the still cooler 56° Fahrenheit.

CEREAL AND OTHER CROPS OF CALIFORNIA.

BY E. W. HILGARD.

OF all the field-crops grown in California, wheat is the most important at this time. It was the first culture on a large scale introduced on the subsidence of the gold fever, and the returns received proved to be so much greater and more certain than those from the placer-mines that it extended rapidly, and has ever since remained the largest and most generally appreciated product of California agriculture. The amount produced in 1878 (an average year) was 22,000,000 centals—of which 8,069,825 were exported as grain—and about 500,000 barrels of flour. In the markets of the world the wheats of the Pacific coast are noted for their high quality—the plumpness and light color of the "berry" and the high percentage of first-class flour it furnishes in milling. At home the extraordinarily high product per acre of forty to sixty bushels, and even more—under very imperfect tillage—for a number of consecutive years, forms a strong incentive to this culture. Nor is the California wheat-grower obliged to be very careful in his choice of seed. Probably every known variety of wheat has in the course of time been brought and tried here, but all in a short time seem to assume very nearly the same peculiar California type, upon which, in fact, it would seem hard to improve materially. It is almost ludicrous, at times, to compare the Eastern seed with its California offspring which has undergone the "swelling process" of one season's growth in her generous soil and climate. It is but fair to say that substantially the same peculiarities are observable in the wheats of Oregon, grown in the valley of the Willamette and on the plains of the upper Columbia. Since the growing season in the greater part of California extends, with little interruption from cold, from the beginning of November to June, the distinction between winter and spring grain is also in a great measure lost. The farmer ploughs and sows as early as practicable, watching his chances between rains—in November and December if he can, in March if he must, or at any convenient time between—increasing the amount of seed sown per acre in proportion as there remains less time for the grain to tiller. Should the ears fail to fill, he can still make hay.

Much discussion has been had concerning the merits of early as compared with late sowing. The objections against the former practice are that copious early rains may start the growth too rapidly, the chances being that in that case but little more water will fall until Christmas. It is true the weather-wise may sometimes gain materially by delay in sowing, but the general result of experience seems to be that it is better in the long run to take the risk of having to sow twice, rather than that of being kept from sowing at all until too late by persistent rains. It has therefore become a very common practice to "dry-sow" grain in summer-fallowed land in September and October. The seed lies quiescent in the parched and dusty ground until called forth by the rains, and in clean fields and ordinary seasons such grain generally yields the highest returns. The preparation of the ground for the crop on the large wheat-farms is usually made by means of gang-ploughs with from two to six shares, drawn by from three to five horses or mules, three animals very commonly walking abreast. At the critical season it is not uncommon to see half a dozen such implements and teams at work in a single field, closely followed by a wagon carrying seed-grain and the centrifugal sower, which showers the grain upon the fresh-turned furrows in strips thirty or more feet wide. Before the day ends the great (usually flexible) harrows have also performed their work, and thirty or forty acres of what was a stubble-field in the morning have been converted into a well-seeded grain-field. Of late, appliances for seeding and covering have been attached to the gang-ploughs themselves, so that the whole task is performed in one operation—certainly the perfection of labor-saving machinery. Seed-drills are as yet in but limited use, although nowhere, probably, would drilling be more desirable in order to admit of subsequent culture, for want of which crops often totally fail on the heavier soils. During the rainy season the covering is often done by rolling alone, and on harrowed ground the roller is frequently used later in the season, in order to compact the surface so as to mitigate the drying effects of "northers."

In the grain-harvest (which begins in the second week of June) the "wholesale" mode of procedure is equally prevalent. The scythe is used only to cut the way, and that on small farms; then follows the reaper, hired if not owned by the farmer himself. But the binding and shocking process that is to succeed is far too slow for the large grain-grower, who has his hundreds, and sometimes thousands, of acres to reap within the short time allowed by the exceedingly rapid maturing, which threatens him with serious loss by shedding, the air being at that season very dry even at night. His implement is the giant header, pushed into the golden fields by from four to eight horses. Its vibrating cutters clip off the heads, with only a few inches of straw attached, on a swath sixteen, and even twenty-eight, feet wide, while a revolving apron carries the laden ears to a wagon driven alongside, and having a curious wide-slanting bed for their reception. Several of these wagons drive back and forth between the swaths and the steam-thresher, where within half an hour the grain that was waving in the morning breeze may be sacked ready for shipment to Liverpool. Even this energetic mode of procedure, however, has appeared too slow to some of the progressive men in business, and we have seen a wondrous and fearful combination of header, thresher, and sacking-wagon moving in procession side by side through the doomed grain. If this stupendous combination and last refinement shall prove practically successful, we shall doubtless next see the flouring-mill itself form a part of this agricultural pageant. Where farming is not done on quite so energetic a plan the reaped and bound grain, being at that season perfectly safe from rain, is left either in shocks or

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THE BIG TREES OF CALIFORNIA

1.—Grizzly Giant, Mariposa Grove. 2.—Three Graces, Calaveras Group. 3.—Scenes in Mariposa Grove.
4.—Trunk of Big Tree, Mariposa Grove. 5.—Natural Arch, Big Tree, Mariposa Grove. 6.—Calaveras Group, Big Trees.

stacks until the threshing-party comes around, mostly with a portable engine, often fed with straw alone, to drive the huge "separator," whose combined din and puffing will sometimes startle late sleepers as it suddenly starts up in the morning from the most unexpected places. Two wagons, usually aided by some "bucks" (a kind of sledge-rake, which also serves to remove the straw from the mouth of the thresher), feed the devouring monster. In an incredibly short time the shocks or stacks are cleared away, and in their stead appear square piles of turgid grain-sacks and broad low hillocks of straw. Both products often remain thus for six or eight weeks, the grain getting so thoroughly dry in the interval that there is frequently an overweight of five or more per cent. when, after its long passage in the damp sea-air, the cargo reaches Liverpool. The moral question thus arising as to who is entitled to the benefit of this increase I will not pretend to determine, but the producers say that they rarely hear of any differences in their favor.

The manner of disposing of the straw is one of the weakest points of California agriculture. Near to cities or cheap transportation much of it is baled like hay and finds a ready market, but in remote districts it is got rid of by applying the torch; and these "straw-fires" habitually redden the autumn skies as do the prairie-fires in the Western States, covering the whole country with a smoke-haze as a faint reminiscence of the Indian summer, which is not otherwise well defined on the Pacific coast. This holocaust of valuable materials, which might be made the means of some slight return of plant-food to the soil, is a standing reproach to those who practise it; yet they have some excuse in the fact that the peculiarities of the climate do not make it as easy to convert it into manure as is the case in countries having summer rains. For in winter the temperature is, after all, too low to favor rapid decay, while during the summer months the intense drought soon puts an end to fermentation. It therefore takes two seasons to render the straw fit for ploughing in; and in the mean time, as left by the thresher, it occupies considerable ground. As yet, the conviction that straw-burning is penny-wisdom and pound-foolishness has not gained sufficient foothold to induce the majority of wheat-growers to take the pains of putting the straw into stacks with concave tops to collect and retain the water. But those who have done so report that the resulting improvement of the soil pays well for the trouble. The practice of burning will, of course, disappear so soon as the system of large-scale planting gives way, as it soon must, to that of mixed farming on a smaller scale.

Of the other cereals, barley and oats are the only ones that can as yet lay claim to general importance; and the methods of culture are much the same. Like the wheats, so the barleys of California are of exceptionally fine quality, that of the "Chevalier" variety being so eagerly sought for by Eastern brewers that but little of it finds its way into California-brewed beer. The common (six- and four-rowed) barleys are, however, themselves of such high quality that the absence of the highest-grade grain is certainly not perceptible in the quality of the beer, into which, unlike most of its Eastern brethren of St. Louis and Chicago, nothing but barley and hops finds its way. The various kinds of oats are produced for home consumption only, the difficulty being very commonly that the straw becomes so strong as to interfere seriously with its use for forage. Rye is grown to some extent in the mountain-counties, and yields a splendid grain, called for chiefly by the taste of the German population for rye bread. Some Polish wheat (*Triticum polonicom*) is grown under the name of "white rye." Maize is thus far grown but to a small extent compared with wheat, barley, and oats—not, however, because of any difficulty in producing corn, which as to quality, size, and yield per acre can compete with any in the Mississippi Valley.

HORTICULTURAL PRODUCTS.

Nothing probably strikes the newcomer in California more forcibly, and nothing certainly more agreeably, than the advantages offered by a climate where plants can ordinarily be kept growing from ten to twelve months in the year, provided water is supplied. The immigrant desiring to make a home for himself is delighted to find that the rapid growth of shrubbery and flowers—and among them many that he has so far seen only nurtured in greenhouses—will enable him to create around him in the course of three seasons, on a bare lot, a home atmosphere that elsewhere it would have required ten or more years to establish. The housewife, however industriously disposed, is not ill pleased to find herself relieved from the annual pressure of the "preserving season" by the circumstance that fresh fruits are in the market at reasonable rates during all but a few weeks in the year, so that a few gallons of jellies is all that is really called for in the way of "putting up." It is not less pleasing to her, as well as to the rest of the family, that a good supply of fresh vegetables is at her command at all seasons, and that the Christmas dinner, if the turkey *does* cost thirty cents a pound, may be graced with crisp lettuce, radishes, and green peas just as readily as it may be celebrated by an open-air picnic on the green grass under blooming bushes of the scarlet gooseberry. Of course there are seasons of preference for each vegetable, and among the great variety naturally introduced by the various nationalities there are few that cannot be found in the San Francisco market at almost any time in the year—if not from local culture, then from some point between Los Angeles and the mouth of the Columbia. The truck-gardens are largely in the hands of the Italians and Portuguese, who have brought with them from their homes habits of thrift; and their manure-piles, windmills for irrigation, and laborious care of their unceasing round of crops on a small area render their establishments easy of recognition. Their products are distributed partly by themselves, partly by the ubiquitous Chinese huckster, trotting with his two huge baskets under a weight that few Caucasians would carry for any length of time. Not a few Chinese also are engaged in the truck-farming business. The vegetables are in general of excellent quality, and it may be truly said that in no city of the United States is the general quality of fare so good, so well adapted to every variety of taste, and (last but not least) so cheap, as in the City of the Golden Gate, and nowhere is the decoration of even the humblest homes with flowers and shrubbery more universal and at the same time so generously aided by Nature.

In no department of industry, probably, is the reputation of California better established than in regard to *fruit-culture*. Its pears seem to have been the pioneers in gaining the award of special excellence; grapes and cherries have rapidly taken a place alongside; and, last, oranges and lemons have come to dispute the palm with Sicily and the Antilles. The most striking peculiarity of California fruit-culture is its astonishing versatility, not to say cosmopolitanism; for the variety of fruits capable of successful culture within the limits under consideration in this article probably exceeds, even at this time, that found elsewhere in any country of similar extent, and is constantly on the increase by the introduction of new kinds from all quarters of the globe. Doubtless, in time each district will settle down to the more or less exclusive production of certain kinds found to be most profitable under its particular circumstances, so far as the large-scale cultures are concerned; but whosoever raises fruit mainly for home consumption will hardly resist the temptation offered by the possibility of growing side by side the fruits of the tropics and those of the north temperate zone—the currant and the orange, the cherry and the fig, the strawberry and the pineapple, the banana and plantain as well as the apple and medlar. It might be supposed that the quality of these products must of necessity suffer grievously under the stress of their mutual concessions of habit; and this, of course, is true as regards the highest qualities of the extremes under the judgment of the expert, but unperceived to a surprising degree by the taste of the public in the general market. The oranges grown in some of the sheltered valleys of the Coast Range and on the red soils of the foot-hills, as far north as Butte county, often successfully dispute the precedence with the product of Los Angeles and San Bernardino.

The exportation of dried fruits of all kinds is doubtless destined to become one of the most important branches of agricultural industry in the State, both on account of quality and of the natural facilities for the drying process offered by the dry summer air. It is found to be absolutely necessary to exclude in the drying operations all access of insects, which otherwise lay their eggs in the fruit and spoil it within a year. This is now very generally and effectually accomplished by the use of the best drying-apparatus, not uncommonly in co-operative factories erected by companies or granges. The quality of the prunes, plums, apricots, pears, etc. cured by some of these establishments is not behind the best of the kind imported from France and Italy, but as yet the neatness and convenience of the packages are not so generally what is necessary to render them equally attractive to the purchaser.

While the orange, lemon, lime, and other sub-tropical fruits are more or less in cultivation up to the northern third of the State, they form the specialty of Los Angeles, San Bernardino, and adjoining counties, where also the pineapple, banana, guava, and other more strictly tropical fruits are mainly under trial. In a measure, what has been said above of the more northern fruits applies here also. While much fruit of the highest quality is produced, much also is still in the experimental stage, and some very poor lots are occasionally thrown upon the market. The subject has lately, however, been earnestly taken in hand by the young but proportionally energetic Horticultural Society of South California, in which a number of the most intelligent men have combined to determine in the shortest possible time, by systematic experiments, discussion, and scientific investigation, in connection with the agricultural department of the university, the practically important questions relating to this culture. While the orange and lemon product is marketed without difficulty and at good prices, the millions of excellent limes borne by the hedges customary in the southern part of the State are still mostly allowed to decay where they fall. The manufacture of citric acid can hardly fail before long to put an end to this waste of precious material. The pomegranate, which is to some extent similarly used, generally finds a ready sale for its fruit. The olive, so generally found around the old missions as a relic of the past, has not so far found its place in general culture, and on the shelves of the grocers in the cities we still find the same mixtures of cotton-seed, peanut, and other oils, with a modicum of the genuine product of the olive, that form the standing complaint of salad-eaters throughout the United States. The subject of olive-culture has of late attracted considerable attention, and small quantities of excellent oil have been made in various parts of the State, proving beyond cavil that its production can be made an important industry. The culture of the fig in California is coextensive with that of the vine, and the fresh and dried fruit of the highest quality is found in the market.

As to nuts, the European walnut, the Italian chestnut, and the almond are those whose culture on a large scale has been successfully carried out. The filbert may also be mentioned. Of these, the almond has been made the subject of the largest experiments, and, as might be expected, there have been numerous disappointments in consequence of the selection of unsuitable localities, subject to light frosts at the time of bloom. The best results have been obtained in situations moderately elevated above the valleys—"thermal belts" where the cold air cannot accumulate. The quality of the product leaves nothing to be desired where proper care is had in the selection of varieties.

The Japanese persimmon promises here, as in the Southern United States, to prove an important acquisition. The jujube, the carob, the pistachio-nut, and many others are under trial.

Of small fruits, the strawberry is in the market during the twelve months of the year. Raspberries and blackberries are largely grown, both for market and canning. The currant is of especial excellence and size, and is extensively grown between the rows in orchards. Gooseberries have not been altogether successful in general culture.

A good deal has been said and written about coffee-culture. It was currently reported that a kind of coffee grew wild in the foot-hills, and that of course the real coffee must succeed. The "wild coffee," however, is simply the California buckthorn (*Frangula Californica*), and of course no more suitable for a beverage than turnip-seed. True, coffee trees are now growing at numerous points in the State, but it is not probable that the culture will prove a success outside of South California.

GOLD-MINING.

WHATEVER may have been said of the evils that have been inflicted upon humanity by the thirst for gold, this fact stands out prominently—that just in proportion to the abundance of the precious metals, in the same ratio have the arts and sciences flourished, trade and commerce increased, the area of civilization been extended, and the comfort, intelligence, and freedom of the masses augmented. "But for the discovery of gold in California," says McClellan, "more than likely San Francisco would be to-day an obscure outpost upon our western coast, Oregon would still be a Territory, Alaska still under the imperial rule of the czar, and the great valleys of California untilled." He might have added, "There would have been no railroad across the continent, and towns and villages would not have bordered the iron track." Where but a few years since the wild buffalo wandered undisturbed, where the war-whoop of the merciless savage struck terror to the hearts of the weary emigrants toiling across the continent to plant the flag and rear the altars of freedom still farther toward the setting sun, is now heard the cheerful whistle of the locomotive as it rushes on over mountain and plain with the speed of the whirlwind. Happy cottagers, secure in their homes, lift up their voices and greet the welcome messenger of civilization as it speeds on in the track of "the star of empire" with its load of living freight.

The discovery of gold in California gave an impetus to commerce that resulted in giving to the world a new style of naval architecture—the American clipper ship. But for this discovery there would now have been no lines of steamers to Australia, New Zealand, Japan, and China—marine palaces that they are, that rob the ocean of half its terrors. Every country bordering upon, and every island bounded by, the vast Pacific Ocean, has been benefited, and its pace in the race of civilization accelerated, by the discovery of gold in California.

It is true gold had been found in California prior to 1848; even so far back as 1510—seventy years before Sir Francis Drake made his descent upon this coast and reported the existence of gold in California—the fact had been noted in a small volume published that year in Spain. The first discovery of "pay dirt" was made near Los Angeles in the year 1838, and these placers were profitably worked for a number of years. In 1846, Thomas O. Larkin, United States Consul for California, in his report to the Secretary of State, said: "There is no doubt but that gold, silver, quicksilver, copper, lead, sulphur, and coal-mines exist in this territory." Sixty-six days after the date of this paper Commodore Sloat hoisted the American flag over the fort at Monterey and took possession of the country in the name of the United States. Had he arrived but a few hours later, the flag of England would have been hoisted in place of the Stars and Stripes, for the British admiral had sailed from Mazatlan about the same time and on the same errand, but was beaten in the race.

Though the precious metals were known to exist previously in California, the grand epoch of the age dates from the discovery of Marshall on the banks of the American River, and this happened just ten days before the treaty of Guadalupe Hidalgo was signed. It is difficult to avoid the impression that this discovery was delayed by the Ruler of events until the times were ripe for its benefits to become widespread among the nations of the earth.

The first attempts at mining were made with implements of the rudest character; nor were any others needed at that time, for in many cases from fifty to one hundred dollars were taken out in one day. Picks, pans, and shovels were first used. The pans were about the size of milk-pans, with a ledge soldered around the outside to assist in handling them. They were first filled with the auriferous dirt and sunk in the water, which flowed in over the sides; when completely saturated, the dirt was stirred and the settling of the gold facilitated by a circular motion. The top dirt was then poured off. This was repeated until nothing but gold and black sand was left, both of which were bagged together in a small buckskin sack, and the black sand afterward taken out with a magnet. Some experience (but the art is easily acquired) is necessary to prevent some of the gold from escaping toward the close of the operation. The rocker was brought to California from Chili. It very much resembles the old-fashioned baby-cradle with rockers. The dirt is thrown in upon a screen in one end, while the water passing over sets the gold free, which falls to the bottom, while the dirt floats off, and the stones are thrown out by hand. The long-tom is a box or short sluice through which a stream of water is kept running. Into this box the dirt is thrown, which, carried down by the stream, falls upon a screen that will only permit small particles to pass through. When the gold is fine, quicksilver is sometimes used in the bottom of the screen. While the pans and rockers were mostly used on the bars convenient to the streams, the long-toms were an invention best adapted to the gulches, where water could only be had in the rainy season. But as the difficulties of securing the gold increased the genius of the inventive Yankee was equal to the occasion. For river-bed mining sluices were invented. These are made of boards sawed for the purpose, the bottom board being wider at one end, enabling the small end to be shipped in forming a lap-joint; transverse cleats, called riffles, are nailed along the bottom, or other means involving the same principle are adopted to save the gold. These riffles are generally charged with quicksilver, and on occasions are not "cleaned up" for weeks. These sluices are sometimes two or three hundred, and in hydraulic mining even a thousand, feet long.

The beds of the rivers or creeks are mined by turning the stream in the dry season, when the water is low. For river-bed mining a favorable location, where the tailings can be got rid of, is selected, and a dam thrown across the stream, while a canal to carry away the water is built along one bank of the river. The seepage-water is taken out by means of a pump, generally worked by a stream of water taken from the dam. When the space below the dam is comparatively dry, the miners wade in, encased in gum-boots impervious to water, and with shovels strip off the top dirt, the gold being found in the clay on the bed-rock, in the crevices, and around the bases of the boulders. These are raised from their beds where too large to be removed by bars and levers, and the dirt worked out from under them and thrown into the sluices that run the entire length of the claim. The large rocks are sometimes broken up by sledges or blasted, and stacked upon one side clear of the work.

As the miners continued their explorations up the streams toward the Sierras, it was soon discovered that the banks of the rivers grew less auriferous beyond a certain point. This led to the discovery of the "blue-gravel" leads, or the beds of the "dead rivers," as they have been called. In some places this gravel is found cemented, and has to be crushed with stamps, like gold-quartz. These gravel deposits were sometimes buried to the depths of thousands of feet beneath the lava of volcanic eruptions. Under these the miners were compelled to tunnel. What has been said in regard to tunnelling veins does not apply to these horizontal deposits of auriferous gravel, that could not be reached in any other manner. The propensity for tunnelling, so common in California under all circumstances, was doubtless acquired by these early examples.

High up in the recesses of the Sierra Nevada Mountains are to be found immense deposits of auriferous dirt several hundred feet in depth. Where these beds are extensive and water plenty and convenient, these claims pay to work even though the gold present does not exceed one cent

SAN FRANCISCO, FROM GOAT ISLAND.

to the square foot of dirt, though most of them pay much more than that. It is necessary to have a good head of water—not less than fifty feet above the bed-rock. This water is led into a small reservoir, into which it is continuously pouring. From this a hose extends to the bottom of the claim. At the end of this hose is a nozzle, tapering from eight inches at the butt to two inches at the orifice. From this the water rushes with such force that it will kill a man as quick as if struck by a bar of steel. When this stream of water is projected against the bank, the dirt or clay is loosened and carried by the current into the sluices, where it is pulverized and the gold set free by pounding against the riffles in its downward course. Hydraulic mining may be considered the perfection of placer-mining, and Americans may pride themselves with being the inventors.

When the dirt in these claims is very compact, it is sometimes blasted out. Long tunnels are run with cross-cuts at the end, in which are stored from one to two hundred kegs of powder, the tunnel filled up and the blast set off. The effect is like a young earthquake in the neighborhood, and thousands of tons of earth and gravel—the débris of ages—is torn from its long resting-place and carried by the torrents to the plains below, where, as in Bear Valley, it has submerged farms.

So much has been said of vein-mining that little more remains to be told. Attention was given to gold quartz-veins in this State as early as 1850. The Mexicans had located some of the richest lodes, and worked the ores in arrastras, after the manner of Mexico. Some even had found rock rich enough to pay handsomely by crushing the choicest specimens in mortars. The first quartz-mill was erected in 1851 at Grass Valley, where this industry has ever since been successfully prosecuted. Some of the mines in this locality have paid large fortunes to their owners. But few of them have ever been put upon the stock board, and under the direction and management of experienced Cornish miners they have been economically developed by shafts following the direction of the vein, which is proved by experience to be the most economical method of working a mine wherever this plan is found practicable. There are many gold quartz-veins in the State that cannot be made to pay to work on account of the rebellious character of the ores, caused by their combination with base metals and sulphur. It is to be hoped that we are on the eve of a revolution in metallurgical processes that will enable all these mines to be worked at a profit.

One of the most remarkable deposits of gold in California is to be found on the Pacific coast, extending from Trinidad, a small port near

Humboldt Bay, to Crescent City. Along this shore is a high bluff of gravel-drift, which most likely owes its existence to the Glacial Period. That it was once elevated far above the level of the sea there is abundant evidence; it is now, however, being constantly washed away by the action of the waves. One of its peculiarities is the great abundance of black sand which may be gathered anywhere along the beach at low water, and with it minute particles of glittering gold. There was a great rush to Gold Bluff in the early days, but the excitement soon died out, and many a flat-broke adventurer returned to curse his folly and the unlucky fate that made him the victim of designing speculators, who had lured him away from a paying claim, which he had abandoned for some one else to jump, in the delusive hope of striking it richer somewhere else. This is the rock upon which thousands of "Forty-niners" have been wrecked. There are, however, yet a number of good paying claims along this beach. It has been conjectured that the richest sands are to be found at some distance from the shore, and a vessel was fitted out with a diving-apparatus for the purpose of securing these golden sands, but the enterprise proved a failure.

The quicksilver-mines of California are next to the gold-mines in importance. Cinnabar has been found in the Coast Range from Trinity county to Santa Barbara. The famous New Almaden mine, in Santa Clara county, was discovered some years before the gold-placers. Besides supplying the demands of California, a surplus was exported to Mexico and China for years before any other quicksilver-mine was worked in this State. Rapidly as the demand for quicksilver has increased since the discovery of silver and gold in Nevada, Idaho, and Montana, California has proved equal to the emergency, and has supplied the increasing demand, with an abundance left for foreign importation, so continuous and rapid have been the developments of our cinnabar-ledges. At this time the most prolific quicksilver district is within a circle around Mount St. Helena whose radius does not exceed thirty miles. In this district are situated the Redington and Manhattan mines at Knoxville, several in Pope Valley, the Great Eastern and Great Western in Lake county, and a number of others in Pine Flat and the vicinity of the Geysers. Besides these are a number of others that have not been referred to, and others that have not been developed, or even prospected, for want of capital. A number are also lying idle, owing to a cloud over the titles awaiting settlement. These are the effects of bad legislation. Many of our mining laws seem to have been framed with an eye to the division of mining profits among the legal profession. These mercurial ores are mostly found in a matrix of silica, in some places resembling chalcedony, in others flint, but generally known among the miners as serpentine. It occurs in vast ledges, in some places two or three hundred feet wide, as at the Manhattan mine, and very frequently is traced for thirty or forty miles, as is the case with the Redington and Great Western lodes. These veins, being in the rural districts, have, many of them, been discovered and are now owned and worked by farmers or others who know nothing about mining, and, as a natural consequence, the work is wretchedly done, while in other cases money is being wasted upon barren rocks where there is not the remotest prospect of finding cinnabar.

THE CHINESE QUESTION.

BY CHARLES G. YALE.

THE Chinese question is one which has been for many years vigorously discussed in California, but never so much as within the past year. There are so many arguments pro and con. that a mere enumeration of the principal points would occupy more space than we have at disposal. The question of Chinese immigration is of more importance to California than to any other State, since it is through her portals that the "hordes of China" are pouring, which some people think are destined to overrun the country, as they are now doing the islands of the South Pacific.

Briefly, however, it may be stated that the opponents of Chinese immigration claim that the presence of these Asiatics in California is destructive to the permanent welfare of the State. They do not come to settle or take upon themselves the duties of citizenship. They all expect to return to China, and even contract to have their bones returned there if they die here. They live on a pittance, and work for wages upon which a white man would starve. They purchase from each other whenever possible, and do as little business with the "Melican man" as may be. They bring no families with them, and nearly all their women in the State are common prostitutes. Their dwelling-places in San Francisco City reek with filth, and "their ways are not our ways." They crowd out of employment not only men and women, but boys and girls. Thousands of Chinese are employed at the expense of nearly an equal number of white people, who are thus kept out of work. They love their own country and their forms of religion so well that they have no desire for citizenship and no thoughts of Christianity. These and many other arguments are brought against them, but the principal one is that with the pecuniary bearing, of course: they work cheaper than white men and take their places.

On the other hand, there are those that argue that if a white man, with the advantages of education, civilization, knowledge of mechanical appliances, intelligence, and energy, in his own land cannot compete in the race for life with these ignorant foreign pagans, he had better go to the wall. It is a deplorable fact that such is the case without a doubt. The Chinese are industrious, frugal, energetic, ambitious, temperate, content with anything, require few amusements, are apt to learn, painstaking, steady, obedient—in fact, are model workmen when trained. Of this there is no doubt, and no one gainsays it. It is for these very reasons, however, when their domestic habits are considered, that white men are unable to compete with them. Their habits of life are totally at variance with ours. They crowd their dwellings like rats, and any hovel is good enough for them. As laborers they are by no means as good as white men: they are not as strong and do less work in a day. They "soldier" even more than the common laborers when they can and are working by the day. On piece-work they work like Trojans, seeming never to tire. In gangs they require a watchful "herder" to keep them at it, and one unused to their ways would lose patience at their efforts.

The feeling is strong throughout California that the immigration of Chinese should be restricted. The people of the State have been condemned wholesale for their opinions on the question, but strangers to the subject should at least consider that the Californians are possessed of ordinary intelligence, and their experience should outweigh the theories of those who are unfamiliar with the matter. At a recent general election, where a vote was taken "for" and "against" Chinese immigration, only two hundred-odd votes were polled in favor of the Chinese out of the many thousands polled in the State.

There is really not that difference of opinion on the subject there would seem among the inhabitants of California. The differences are not on the question of restricting the immigration or the policy of the matter; it is only a question of means. The respectable portion of the community consider their presence an evil, but they at the same time wish to see them protected now that they are here, and do not wish to see any unlawful measures adopted concerning them. They desire the general government to take the matter in hand and restrict any further immigration. Extremists wish to forcibly expel those now in the country; the more moderate want to let those here alone, but prevent more coming. They argue that those in California made the present railroad system of the State not only a possibility, but a fixed fact; that their presence has admitted of the establishment and continuance of many industries which would not otherwise exist; that they are necessary to gather our crops of small fruits, grapes, etc., etc.—for without them labor in such channels would be scarce—to work our quicksilver and similar mines, to cultivate the swamp-lands, to build irrigating-ditches, to reclaim tule-lands, and do other drudgery and unhealthy work which white men would refuse.

Probably if they confined themselves to such occupations there would be no complaint. But they fill the factories where shoes, hats, shirts, clothes, cigars, matches, rope, jute, wooden-ware, brooms, blankets, canned goods, etc. are made, and crowd out white labor. The manufacturers say, however, that without them these and many other industries could not compete with Eastern markets, and they would be compelled to close permanently. The Californians have been brought face to face with these questions and many more complicated ones from day to day for years, and it is small wonder that the general desire for some decision by the government is anxiously looked for by all classes.

A LABOR QUESTION.

BY HON. EDWIN R. MEADE.

THE Chinaman comes here as a laborer. He personifies the character in its absolutely menial aspect—what the operation of fifty centuries of paganism, poverty, and oppression have made him—a mere animal machine, performing the duties in his accepted sphere punctually and patiently, but utterly incapable of any improvement; and in this aspect of the question the most serious phase of the problem is presented.

The qualities of coolie labor mentioned, and the fact that it can be secured in any desired amount and discharged without controversy, render it especially attractive to capitalists and contractors. African slave labor presented to some extent the same features, but in a marked degree coolie labor is cheaper, and therefore competitive with white labor.

In China wages are from six to twenty cents per day, or from three to five dollars per month, when work can be procured, which is not always the case. In California wages of all kinds have been somewhat fluctuating, but, as compared with white labor, coolie labor has averaged for the past few years about as follows

Domestics	10 per cent. less.
Hostlers and gardeners	30 to 50 per cent. less.
Farm hands	20 to 30 per cent. less.
Common laborers	50 to 60 per cent. less.
Artisans	50 per cent. less.
Laundrymen, etc.	50 per cent. less.

Coolies seem adapted to all kinds of manual work except that requiring unusual strength, such as foundrymen, etc., and their service bears a favorable comparison with white labor. It has maintained its relative cheapness, however, by reason of a public sentiment opposed to it, and in some degree through the ignorance of the coolies themselves of its comparative value.

If wages are to be regulated by habits of living, our rates paid coolies are as much above their wants as they are below those of white laborers, and thus, while offering an inducement for immigration which is irresistible, they may yet be very much reduced and still supply the coolie's wants, which are of the simplest kind. He has evidently reached the minimum at which existence may be maintained, and he desires little more. His food is usually a little rice—sometimes, as in India, mixed with curry, in this country occasionally with a piece of pork or fish—the whole not costing over from twenty-five cents to fifty cents per week; besides, it is not exaggerated that he will feed upon the meanest kind of food, including vermin. His dress, now so well known, consists of the cheapest quality, without under-garments or any of the accessories which we consider quite indispensable to a complete raiment. His rent is barely nominal. He occupies a small room in common with twenty to fifty others, platforms being raised so as to economize space to the fullest extent. Coolie lodgings literally resemble a box filled with herrings. A separate room for cooking or other purposes, as with whites, is quite unknown. He has no other expenses, unless he indulges in the national vice of gambling or that product of British beneficence, opium-smoking. He has, therefore, little waste, and luxuries which with us have become recognized necessities he entirely ignores, including his native tea.

It is impossible that the white laborer can exist in presence of these conditions. Not only substantial food, comfortable clothing, and decent household accommodations are necessary to him, but his family must be supported in a respectable manner and schooling and religious training be provided for his children. These latter have become essential, and are the glory of our race and nation. The white laborer could not succeed if he would attempt competition with the coolie, and will always be driven from his presence, as cheap currency displaces the better; for while it is true that wages are relatively highest on the Pacific coast, the coolie reduces wages and competes everywhere. White labor will not submit to the degradation of a rivalry with such a competitor, but will either assert its power through the government or be driven from the presence of the coolie altogether. The rule of demand regulating supply may be true of coolie labor alone, but with its numbers, habits, and restricted expenses the rule will not apply to white labor at the same time.

Recent disturbances in regard to labor show the importance of this aspect of the question, and irresistibly awaken the conviction that cheap labor is not desirable in this country; and whatever folly there may be in the idea of establishing a minimum of wages by the government, it may properly withdraw encouragement from cheap labor, even at the expense of dividends on diluted capital as represented in watered stock. We require liberal wages to meet high tariffs, high taxes, and heavy charges for transportation. Coolie labor means to white labor starvation, almshouses, prisons filled, and, lastly, capital wasting itself. Liberal wages and white labor mean prosperity for all classes and progress in the ways of Christian civilization. All fancied advantages which have followed the introduction of coolies in this country disappear before the prospects to which their future in this country would invite us.

DECISION BY THE CIRCUIT COURT.

IN the test case (March, 1880) to try the validity of the State law of California prohibiting the employment of Chinese by corporations, Judges Sawyer and Hoffman of the Circuit Court in San Francisco declared the law unconstitutional. In summing up the case the court delivered the following opinion:

"That the unrestricted immigration of the Chinese to this country is a great and growing evil, that it presses with great severity on the laboring and operative classes, and that if allowed to continue in numbers in any considerable proportion to that of the teeming population of the Chinese empire it will be a menace to our peace and even our civilization, is an opinion entertained by most thoughtful persons in this State.

"The demand, therefore, that the treaty shall be rescinded or modified is reasonable and legitimate. But while that treaty exists the Chinese have the same rights of immigration and residence as are possessed by any other foreigners. These rights it is the duty of the courts to maintain and of the government to enforce. The declaration that the Chinese must go, peaceably or forcibly, is an insolent contempt of national obligations and defiance of national authority. Before it can be carried into effect by force the authority of the United States must first be not only tried, but resisted and overcome.

"The attempt to effect this object by violence will be crushed by the power of the government. The attempt to attain the same object indirectly will be met with equal promptness by the courts, no matter whether it assumes the guise of an exercise of the political power, or the power to regulate corporations, or any other power reserved by the State, and no matter whether it take the power of a constitutional provision, legislative enactment, or municipal ordinance."

EXTRACT FROM AN ADDRESS BY REV. JOSEPH COOK.

THE Chinese question is really whether the monopoly of low-paid labor shall be given to the Irish and other foreign elements, or shall be divided with the Chinamen? If the Chinamen now in San Francisco were expelled, wages would go up again—not to the height at which they stood in the gold period, but far higher than they are now. At present they are conspicuously higher than they are in the East. There was a day in California when the average workingman was paid ten dollars for ten hours of labor, and eggs cost twenty-five cents apiece. The time has now come when the Chinaman receives about what we pay white laborers in the East.

John Chinaman has not displaced anybody: he has filled up gaps. White men, let us suppose, abandon a mine when it will not pay three dollars a day to each laborer. The Chinaman is content with two dollars a day, and he works the mine. Has he displaced the miner who abandons the mine? He has taken his place, but he has only filled up a vacancy.

If a man wishes to start a woollen-factory, and must pay three dollars a day for labor, he sees he cannot do it in San Francisco and compete with Lowell and Lawrence. In comes John Chinaman, who can be hired for a price at which it will pay to manufacture woollen goods on the Pacific Slope. The Irishman, with the pickaxe and the hod, does part of the work of putting up the factory, and there is work made in various ways for all the higher grades of labor by the coming in of laborers at prices that permit profit. The Pacific Slope needs diversification of labor, and the Chinaman has helped to supply this need. Wages will come to a level on the Pacific Slope, and manufacturing will start up in California.

The fact that ninety thousand Chinamen find constant employment on the Pacific coast at a respectable rate of remuneration is proof that they are needed there. A man who employs Chinamen is to be counted as in favor of Chinese immigration. If one hundred and forty thousand votes should be cast against Chinese immigration in California, it would yet be true that the majority are really in favor of it, because more than seventy thousand people in California employ Chinamen. The newspapers of San Francisco do not properly represent the feelings of the best classes of society there on the Chinese question.

OUR RELATIONS WITH CHINA.

BY S. W. WILLIAMS, LL.D.

IN considering the political relations between China and the United States it is well to refer to the fifth article in the treaty negotiated at Washington, known as the Burlingame Treaty, as it is continually referred to in this country as bearing on the immigration of the Chinese. It is supposed by many that that article stimulated emigration to America, as its modification or abrogation will stop it. Though Mr. Burlingame was invested with full powers, it was not expected that he would negotiate any new treaties, and his associate envoys were very reluctant to affix their names to this one without express instructions from Peking. It is, as a whole, rather an amplification of the stipulations and spirit of the treaty of 1858, and does not grant any really new privileges.

It is not likely that the Burlingame Treaty has ever had any perceptible effect on the immigration of the Chinese to this country. Few, very few, of the people know that such an article as the one mentioned exists. They do know that none of their countrymen go as contract-laborers to the United States, and that when a man leaves Hong-Kong under the American flag for the Kau-Kam-Shan, or old Gold Hills, there is a certainty of his friends hearing from him, and of his return home (if living) when he pleases. This treaty was made about twenty years after the immigration to California had set in, and myriads had gone out and returned home in the mean time. When Mr. Burlingame returned from San Francisco to Peking in 1866, he reported to the Chinese that a million of laborers could find employment on the Pacific coast. The Pacific Railroad had not then been completed, and the prospect to the capitalists engaged in that and other public and private works of getting labor from China at a cheaper rate than could elsewhere be obtained was very tempting. The Chinese were likely to be well treated when they could be hired at half the price of Irish and German laborers.

It should be stated, too, that, strictly speaking, none come to this country direct from China: from the very first thay have all sailed away to San Francisco from British territory; the ships have come under British rules and restrictions in relation to provisioning and numbers; and British officers at Hong-Kong have given clearances to ships with Chinese going to San Francisco, just as British officers have given them to ships with Irish going from Queenstown. The Burlingame Treaty would not anyhow have prevented Chinese going to Hong-Kong, and the emperor of China cannot stop his subjects going abroad. The old and common ideas respecting the danger to a man who did so have been exaggerated, for no one was punished who returned home; on the contrary, in olden times he was regarded with curious interest if he had gone at first from places far in the interior. Probably not five per cent. ever did return; and far the greater part of those who have gone to Siam, India, and the Archipelago, and elsewhere, went of their own accord, and on the same conditions that they have gone to California and Australia—viz. by mortgaging their labor to pay for their passage.

The above is one side of the Chinese question. That of treaties, of capital and labor, and of treatment of our citizens in China, where we have compelled their rulers to let us live under our own laws within their borders, is the other. This right of ex-territorial jurisdiction is a sore spot in the minds of those rulers, and they usually oppose any demands for further privileges on the part of American representatives, and even of all foreign nations, by comparing the legal position of the two peoples in each other's territories.

Comparing the civilization of one class with that of the other in this singular condition of things, what do we see? The first has been nurtured under the highest standards of moral principles, and claims to be guided by elevated sentiments and an intelligent public opinion; and yet all this has failed to secure the commonest rights of humanity to the second, which is weak, ignorant, poor, and unprotected. When the Chinese first arrived in California after the gold was discovered, they were not allowed to testify in the courts, and the consequences were such as were well known in the slave States, where the evidence of negroes was ruled out. Murders, robberies, oppressions, and assaults upon them became so common, and usually so unpunishable for want of evidence, that the legislators of California, for their own protection, were induced to pass an act allowing the Chinese to testify. Discriminating laws were passed against them, and their labor was taxed without securing to them the protection and privileges they paid for. The fact that the treaties were made with the government of the United States seems to have had no weight with the rulers of the States where the Chinese suffered these things. They fell between two stools. They had neither opportunity to know their treaty-rights, money to go into the proper courts, advocates to plead for them, nor the least consular protection or cognizance from their own home government in Peking. The high officers there were urged to appoint suitable men to go to San Francisco as Chinese consuls, but while they acknowledged its importance, they could not, rather than would not, see their way clear to do so.

To say that the great majority of Chinese now in our borders are fairly treated and have been paid their wages, and that the cases of outrage and unredressed wrongs form the vast exception, is simply to evade the responsibility which rests on a government to secure protection to every individual within its jurisdiction. The government of the United States properly requires and expects that every American citizen visiting or residing in China shall be treated justly by the Chinese government, and its consuls dwelling at the ports would soon be recalled if they failed to do their utmost to redress wrongs suffered in life, limb, or property by the poorest citizen. The imperial government has already paid out 6 about eight hundred thousand dollars to indemnify the losses of our citizens within its territory. Some of these losses were incurred by the direct act of British forces setting fire to the houses of Americans, and almost in no case were they caused by direct attacks on them as such. Mission-chapels have been destroyed or pillaged by mobs at Tientsin, Shanghai, Fuhchau, and Canton, and indemnity made in every case.

How mortifying is the record of robberies, murders, arsons, and assaults committed on peaceable Chinese living on the Pacific coast, not one of whom had any power to plead his case, and most of whom probably suffered in silence! Do we excuse ourselves from fulfilling treaty-obligations—the most solemn obligations a nation can impose on itself, and whose infraction ought always to involve loss of character and moral power—because the Chinese government is a pagan government, and weak, too, as well? Can this nation look quietly on while Chinese are murdered and their houses burned over their heads in California, and no one is executed for such murders or mulcted for such arsons, and then excuse itself for such a breach of faith because these acts were committed in that State and no Chinese consul is there to plead officially for redress? It is not implied by this that no murderer has ever been executed for taking their lives or robber punished for his crimes. But every one knows that such criminals do escape punishment, and that the Chinese in that State feel their insecurity and weakness. Woe be to them if they should attempt to redress their own wrongs!

This point is quite a different question from the speculative ones—Whether the immigration of the Chinese should be allowed? whether their labor will not destroy our own? whether we can absorb and assimilate such a mass of ignorant, immoral, and degraded heathens? The point brought up in these remarks refers to the treaty-obligations the American people have voluntarily taken upon themselves in reference to the Chinese. We may say that we are suffering these evils from that people, and are determined to prevent any more of them coming. If the balance of evils suffered by the parties to these treaties were struck, the Chinese would be found to have had by far the worst of them. It is better far to show that the treaties have brought more good results in their train to both than evil, and that it is for our own highest welfare to treat those whom we have done so much to induce to come here with at least as much justice as we demand of them. Some fear that this country will be swamped altogether by this flood of aliens, but the one hundred and twenty-five thousand, or so, of Chinese now in this land, with few exceptions, all came from a small portion—two prefectures—of Kwangtung province. There is no probability of other parts of the empire joining in this emigration, for several reasons, one of which is the great difference in their dialects. The labor question, also, is quite irrelevant to the one before us. The laws of supply and demand, wages and work, food and machinery, are among the most vital and difficult of solution among mankind, and will doubtless often come into collision until their complicated interests are better understood. But to allow one ignorant laborer to maltreat another with impunity because the former is stronger, has a vote, and will not try to understand why he suffers just as myriads of other laborers do who are not troubled with the "heathen Chinee," is to sap and weaken all law and order. If they are an inferior race, as we roundly assert, there is no fear of their ever interfering with our supremacy here in any department, and policy alone would counsel us to treat them fairly; and, on the other hand, if they can rise in our own land, under the same democratic institutions and Christian training, to be our equals, we cannot, as a nation living next to them just across the Pacific, well afford to treat them as enemies.

The Chinese were treated reasonably well in California as long as our citizens could make money out of their cheap labor and when the hopes of getting a large portion of the China and East India trade were encouraging. They had not carefully studied the thrifty and economical habits of the laborers whom they invited in to compete with native workmen, nor how soon the real power of those habits, which have given the Chinese their superiority in Asia, would be seen here. No measures were taken by the rulers of California or San Francisco to compel the immigrants to live with some regard to their own health and the public comfort, but when they became "nuisances" to others from their overcrowding, then the whole blame was put upon them, whereas the chief fault lay with the municipality for not teaching them how to live properly. Further, a wise policy would have led the city and State authorities to educate suitable men in the Chinese language, who could have acted as their interpreters and translators, and thus maintained an intelligent intercourse with these people. Nothing of the kind has ever been done, though measures are taken in several other States to aid Germans, Norwegians, etc. in understanding our laws in their own tongue, so that no mistakes may be made.

THE BURLINGAME TREATY.

Additional Articles to the Treaty between the United States of America and the Ta-Tsing Empire of the 18th of June, 1858.

WHEREAS, since the conclusion of the treaty between the United States of America and the Ta-Tsing empire (China) of the 18th of June, 1858, circumstances have arisen showing the necessity of additional articles thereto, the President of the United States and the august sovereign of the Ta-Tsing empire have named for their plenipotentiaries, to wit—the President of the United States of America, William H. Seward, Secretary of State; and His Majesty the emperor of China, Anson Burlingame, accredited as his envoy extraordinary and minister plenipotentiary, and Chih-Kang and Sun Chia-Ku, of the second Chinese rank, associated high envoys and ministers of His said Majesty; and the said plenipotentiaries, after having exchanged their full powers, found to be in due and proper form, have agreed upon the following articles:

ARTICLE I. His Majesty the emperor of China being of the opinion that, in making concessions to the citizens or subjects of foreign powers of the privilege of residing on certain tracts of land or resorting to certain waters of that empire for purposes of trade, he has by no means relinquished his right of eminent domain or dominion over the said land and waters, hereby agrees that no such concession or grant shall be construed to give to any power or party which may be at war with or hostile to the United States the right to attack the citizens of the United States or their property within the said lands or waters; and the United States, for themselves, hereby agree to abstain from offensively attacking the citizens or subjects of any power or party or their property with which they may be at war on any such tract of land or waters of the said empire; but nothing in this article shall be construed to prevent the United States from resisting an attack by any hostile power or party upon their citizens or their property. It is further agreed that if any right or interest in any tract of land in China has been or shall hereafter be granted by the government of China to the United States or their citizens for purposes of trade or commerce, that grant shall in no event be construed to divest the Chinese authorities of their right of jurisdiction over persons and property within said tract of land, except so far as that right may have been expressly relinquished by treaty.

ART. II. The United States of America and His Majesty the emperor of China, believing that the safety and prosperity of commerce will thereby best be promoted, agree that any privilege or immunity in respect to trade or navigation within the Chinese dominions which may not have been stipulated for by treaty shall be subject to the discretion of the Chinese government, and may be regulated by it accordingly, but not in a manner or spirit incompatible with the treaty-stipulations of the parties.

ART. III. The emperor of China shall have the right to appoint consuls at ports of the United States, who shall enjoy the same privileges and immunities as those which are enjoyed by public law and treaty in the United States by the consuls of Great Britain and Russia, or either of them.

ART. IV. The twenty-ninth article of the treaty of the 18th of June, 1858, having stipulated for the exemption of Christian citizens of the United States and Chinese converts from persecution in China on account of their faith, it is further agreed that citizens of the United States in China of every religious persuasion, and Chinese subjects in the United States, shall enjoy entire liberty of conscience, and shall be exempt from all disability or persecution on account of their religious faith or worship in either country. Cemeteries for sepulture of the dead of whatever nativity or nationality shall be held in respect and free from disturbance or profanation.

ART. V. The United States of America and the emperor of China cordially recognize the inherent and inalienable right of man to change his home and allegiance, and also the mutual advantage of the free migration and emigration of their citizens and subjects respectively from the one country to the other for purposes of curiosity, of trade, or as permanent residents. The high contracting parties, therefore, join in reprobating any other than an entirely voluntary emigration for these purposes. They consequently agree to pass laws making it a penal offence for a citizen of the United States or Chinese subjects to take Chinese subjects either to the United States or to any other foreign country, or for a Chinese subject or citizen of the United States to take citizens of the United States to China or to any other foreign country, without their free and voluntary consent respectively.

ART. VI. Citizens of the United States visiting or residing in China shall enjoy the same privileges, immunities, or exemptions in respect to travel or residence as may there be enjoyed by the citizens or subjects of the most favored nation, and, reciprocally, Chinese subjects visiting or residing in the United States shall enjoy the same privileges, immunities, and exemptions in respect to travel or residence as may there be enjoyed by the citizens or subjects of the most favored nation. But nothing herein contained shall be held to confer naturalization upon citizens of the United States in China nor upon the subjects of China in the United States.

Art. VII. Citizens of the United States shall enjoy all the privileges of the public educational institutions under the control of the government of China, and, reciprocally, Chinese subjects shall enjoy all the privileges of the public educational institutions under the control of the government of the United States, which are enjoyed in the respective countries by the citizens or subjects of the most favored nation. The citizens of the United States may freely establish and maintain schools within the empire of China at those places where foreigners are by treaty permitted to reside, and, reciprocally, Chinese subjects may enjoy the same privileges and immunities in the United States.

Art. VIII. The United States, always disclaiming and discouraging all practices of unnecessary dictation and intervention by one nation in the affairs or domestic administration of another, do hereby freely disclaim and disavow any intention or right to intervene in the domestic administration of China in regard to the construction of railroads, telegraphs, or other material internal improvements. On the other hand, His Majesty the emperor of China reserves to himself the right to decide the time and manner and circumstances of introducing such improvements within his dominions. With this mutual understanding it is agreed by the contracting parties that if at any time hereafter His Imperial Majesty shall determine to construct or cause to be constructed works of the character mentioned within the empire, and shall make application to the United States or any other Western power for facilities to carry out that policy, the United States will, in that case, designate and authorize suitable engineers to be employed by the Chinese government, and will recommend to other nations an equal compliance with such application, the Chinese government in that case protecting such engineers in their persons and property and paying them a reasonable compensation for their service.

In faith whereof the respective plenipotentiaries have signed this treaty and thereto affixed the seals of their arms.

Done at Washington the twenty-eighth day of July, in the year of our Lord one thousand eight hundred and sixty-eight.

[SEAL.] William H. Seward.

[SEAL.] Anson Burlingame,
Chih-Kang,
Sun Chia-Ku.

CONDITION OF EDUCATION IN THE STATES AND TERRITORIES WEST OF THE MISSISSIPPI.

PREPARED BY THE BUREAU OF EDUCATION, WASHINGTON, D. C.

GENERAL EFFECTS OF THE EXHIBITS OF AMERICAN EDUCATION.

IN the successive international expositions from 1851 to 1878 no contributions from the United States made a stronger impression than her school-exhibits. They were the occasion of innumerable inquiries, of many foreign reports, and of imposing delegations of European officials commissioned to examine in person that system of which the epitomized representations were so suggestive.

FOREIGN CRITICS.

While criticisms have not been wanting in the reports of these impartial examiners, their commendations have been profuse and emphatic. Certainly, they do not find our schools more efficient or our standards higher than those of France and Germany, but they are profoundly impressed with the fact that almost every section of this vast territory, inhabited by a heterogeneous people, is so thoroughly imbued with the school spirit. However far westward the traveller pursues his way, the school-house is in advance of him, emphasizing by its recurrence the toast given at a dinner of school officers: "The ubiquitous American school-house."

"What," said a Western host to his English guest *en route* for Pike's Peak—"What do you expect to see at the top of Pike's Peak?"—"A school-house," was the ready response.

MAGNITUDE OF THE SCHOOL SYSTEM.

Foreigners who are hopelessly entangled in our federal divisions, who are not quite certain whether we are Caucasians or Indians, who fancy that the Sand Lots are in Wall street, whose imaginations perpetually incline to restrict our territory to a strip along the Atlantic,—seem to understand perfectly well that our free schools extend across a continent which stretches twenty-five hundred miles from shore to shore. It is difficult for the citizens of our own Eastern States to realize how large a proportion of our territory is west of the Mississippi, and equally difficult for them to comprehend that its common-school advantages are not in general inferior to those of the older sections.

GENERAL VIEW OF EDUCATIONAL CONDITION.

Every State west of the Mississippi has a school clause in its constitution, an organized school system, a permanent school fund, and a State superintendent. State educational associations or similar societies exist in all, and six educational journals are published within their limits, serving to diffuse educational intelligence, to promote emulation, and to promulgate new ideas. Thus the common school is guaranteed by statute and by popular sentiment.

EARLY ACTION.

It is matter of history that education had taken an extensive lien on the Western wilds before the emigrant had located his claim. In 1785, Congress established "an ordinance for disposing of the lands in the Western Territory," which contained the following provision: "There shall be reserved the lot No. 16 of every township for the maintenance of public schools within the said township." The ordinance for the government of the territory of the United States north-west of the river Ohio, adopted July 13, 1787, confirmed the provision of 1785.

In 1848, on the organization of the Territory of Oregon, the quantity of land reserved for the benefit of common schools was doubled; and to each new Territory organized and State admitted since, except West Virginia, the sixteenth and thirty-sixth sections of every township—one-eighteenth of the entire area—have been granted for common schools; and in 1862 the law granting lands to each State to endow "colleges of agriculture and the mechanic arts" was enacted. The lands granted to the several States under this last act aggregated 9,600,000 acres. These grants have been augmented by special acts and by State appropriations, securing to the States under consideration permanent school funds estimated, from the latest returns, as follows:

STATES.	Amount of available school fund.	Amount of permanent school fund, including portion not now available.
Arkansas	$11,200	$191,097
California	2,011,800	
Iowa	3,486,799	
Kansas	2,288,390	10,000,000
Louisiana	82,921	
Minnesota	3,859,964	15,000,000
Missouri	2,909,457	7,278,503
Nebraska	2,120,182	18,734,848
Nevada	274,500	
Oregon	....	509,000

In the Territories also the necessary provisions exist from which school systems can be developed according to the intelligence and enterprise of the subsequent population. Each Territory has a superintendent of education, appointed by the President, as in Arizona, or by the Territorial governor, as in Idaho, or elected, as in Utah, by the people; and each has the nucleus of a permanent school fund arising from land grants.

EXAMINATION BY STATES.

To understand the developments from these auspicious beginnings, it is necessary to examine the State systems severally and in detail.

TEXAS, LOUISIANA, AND ARKANSAS.

Peculiar difficulties have been encountered in the endeavor to establish free schools where slavery existed before the war. Ignorance of the methods and principles of public education, false conceptions of its political and social as well as of its intellectual bearings, impoverished treasuries, and race-prejudices have combined to resist its inception and progress, as illustrated in the records of Texas, Louisiana, Arkansas, and, to some extent, of Missouri. How largely school interests are here complicated with the question of races is suggested in the following figures:

STATES.	WHITE.			COLORED.		
	School population.	Enrolment.	Percentage of population enrolled.	School population.	Enrolment.	Percentage of population enrolled.
Arkansas	159,388	24,850	16	57,067	8,897	16
Louisiana	88,567	43,197	49	108,548	33,632	31
Missouri	650,368	428,975	66	37,880	19,208	51
Texas	149,719	105,485	70	44,634	41,461	93

In Texas co-education of the races is at present prohibited by law, and in the other States it is rarely attempted, separate schools being in general preferred by both white and colored.

This peculiar source of irritation having been disposed of according to local feeling, the other obstacles appear less formidable; and if in these States free schools can hardly be said as yet to have the endorsement of public favor, their friends are earnest and judicious, a good foundation has been laid, and enough already achieved to justify hopeful predictions.

TEXAS.

Upon a close inspection Texas appears to deserve the palm for illiteracy. From eight to fourteen years is accounted the legal school age, which, with school years contracted to sessions of three months (the average duration for 1878–79), gives the somewhat startling minimum of eighteen months' schooling as a grand total per individual.

In place of the district system which prevails in most States, the community system, or voluntary association of neighboring families without regard to district lines, has been adopted—oftentimes the only practicable system in sparsely-settled communities.

There is a noticeable preponderance of male over female teachers in the State, the entire number of the former, white and colored, being estimated at 3457, at an average salary of forty-two dollars per month, against 873 female, at an average salary of twenty-seven dollars per month.

Teachers cannot make legal contracts to teach without a certificate of examination; in many instances the salary is fixed upon the basis of actual daily attendance, which appears like an insidious endeavor to combine the duties of teacher and truant-officer.

Houston, with a population of 27,000, enumerates only 2214 as of legal school age, of which number only 1864 are enrolled in public schools, with an average attendance of 1420; nor do the surplus children appear to be gathered in private or church schools, only 425 being reported as enjoying this distinction.

The entire school population of the State is estimated at 194,353, for whose accommodation there are about four thousand school-houses.

While the foregoing details are not decidedly flattering, when we turn to the action of the General Assembly we realize that there is an active and aggressive school spirit in the State. Early in 1879 the Assembly passed a law making very liberal provision for the schools; which act the governor vetoed. According to his own explanation, he was not unfriendly to the schools, but could devise no better means for their improvement than cutting off their revenues till normal schools should have trained a better class of teachers. This novel construction of the law of supply and demand served to elicit vehement public discussion, and although the party of the governor prevailed to the extent of reducing the school appropriation from one-fourth to one-sixth of the general revenue, the school cause received a decided impetus.

The most important result of this agitation was the establishment of two normal schools—one at Huntsville, for white, and the other at Prairie View, for colored pupils. A donation of six thousand dollars was made from the Peabody Fund in aid of this important measure.

It would be unfair to leave Texas without a word for the little town of Brenham. This German settlement of four thousand souls presents the proud record of a complete course of public instruction through three distinct grades—viz. primary, grammar, and high schools, representing nine scholastic years—a model as bright and significant as the Lone Star of the Texan banner.

LOUISIANA.

In Louisiana the importance of a well-ordered system of public education maintained by law is fully recognized. Intelligent efforts are made to secure sufficient appropriations for its support, and to bring it under efficient and responsible supervision, and equal facilities are provided for white and colored children.

The number of children in Louisiana of the school age (viz. six to twenty-one years) is reported at 274,406; the enrolment in public schools 83,047, or a little over one-third of the whole school population. In New Orleans there are 14,834 white children and 5460 colored in the public schools, but in the country parishes the number of white and of colored children is nearly equal, there being 28,363 of the former and 28,172 of the latter. The importance of this item is realized when we consider that of the 100,000 voters of the State, 82,000 are colored, and that of this number 60,000 are unable to read. Fortunately, the colored people eagerly avail themselves of the free-school advantages.

The clause in the law permitting the use of the French language in schools where necessary is in the interests of the French population of the southern parishes, who cling with fond tenacity to their mother-tongue.

A CHANCE PICTURE.

The traveller in Southern Louisiana, floating along the sluggish rivers and bayous, skimming past cypress-swamps or idling beneath the spreading cottonwood, lost in reveries of the careless life of the city above or of the "land of streams" around, meets, perchance, a strange being sculling his oyster-lugger or banana-skiff or flitting across the wastes to his hut in the clearing, "remote, unfriendly, melancholy, slow." The stamp of distinct nationality in his countenance, his dejected, listless air, equally at variance with the energy of the Northerner and the buoyancy of the Louisianian, excite curiosity.

Pushing along the streams and crossing the labyrinth of brush and creeks and slips of land and water-basins, to a ridge of alluvion on the river-margin, the traveller beholds an Acajen settlement, a cluster of adobe cabins thatched with palmetto-leaves and interspersed with orange-groves and clumps of bananas, which indicate the industries of the simple tenants.

Neither the name nor the settler suggests the Acadians of Grand Pré, yet, indeed, here is the last remnant of those exiles, the sad close of a life begun in idyllic ease upon our northern coast; in the quiet depths of these swamps the Norman outcasts have found the oblivion they sought. Even here modern progress has thrust in its entering wedge—the free school. The school-building is often an impromptu log hut or a mere adobe cabin, the famed "maison d'Acadien."

The work of the schools is necessarily the work of translation, doubly difficult, since the language of the pupils has no written expression. It is not English, it is not French, it is not even a dialect, but a mere patois. To render English books intelligible to the children, to wean them from the corrupted speech they love, and to substitute in its place the English tongue, symbol to them of oppression, is the delicate task of the teacher. It is a little singular that the hardest book for the English child is the easiest for the Acajen, as the increased number of words of Latin or French origin found in the higher books affords suggestive points entirely wanting in the Saxon page. You cannot help wondering, as you see these students poring over the lessons, if something of English energy and endurance will penetrate their minds through the English speech, and a new life spring from these forces, beautiful as Acadia, vigorous as the English stock which is thus grafted into their languishing spirit.

SCHOOLS OF NEW ORLEANS.

In the city of New Orleans public schools have made greater progress than in the rural parishes. The primary grades are much overcrowded, owing to the lack of sufficient school-houses and teachers—an evil which the school authorities are remedying as rapidly as they can. The city has a just pride in her three public academies—one for white boys, another for white girls, and a third for colored girls and boys. The Peabody Normal Seminary at New Orleans, free to white students, offers a course of professional training to graduates of the city academies or high schools and other institutions.

NORMAL SCHOOLS.

There is also a normal school for colored students sustained by the Peabody Fund, while departments in the universities of Leland, Straight, and New Orleans give instruction to colored pupils desiring to prepare themselves for teaching.

STATE INSTITUTIONS.

The Louisiana Institution for the Deaf and Dumb and the Institution for the Blind—both at Baton Rogue—evince the care of the State for these unfortunates.

PRIVATE SCHOOLS.

Many private and denominational schools are supported throughout the State, and are especially flourishing in New Orleans. The entire number of teachers employed in the free schools of the State is reported as 2168 male and 3498 female, the former at an average salary of $33.68 per month, the latter of $27.10.

ARKANSAS.

What Arkansas needs in the matter of public education is emphatically more light. All the newspapers in the State are committed to the free-school system, and there is a marked awakening of public interest in the subject; but the schools themselves are in a chaotic condition. The educational scheme has outstripped the practical development, because the people have not understood how to work out their problem, nor have the appropriations been adequate to the requirements.

ELEMENTARY SCHOOLS.

In 1878 less than one-fifth of the whole school population was enrolled in public schools, and very few private schools existed. In the autumn of 1879, Dr. Sears, general agent for the trustees of the Peabody Fund, acting in concert with the State superintendent, engaged a gentleman of distinguished abilities to canvass the entire State in the threefold capacity of lecturer, conductor of teachers' institutes, and visitor of schools. The results of the effort are already apparent in a fuller realization of the importance of public education, greater fidelity on the part of school officers, fuller and prompter returns from district and county officers, and increased efforts on the part of teachers to organize in teachers' institutes and associations.

The annual income of the State school fund, with one dollar per capita assessed on each male inhabitant over twenty-one, and a tax restricted to two mills on the dollar for the State, and to five mills on the dollar for school districts, affords the revenue for the public schools. In 1878 this amounted to $170,335, of which sum $148,393 was expended. The number of teachers reported for the same year was 875, at an average salary of fifty dollars per month for men and forty dollars for women.

COLLEGIATE INSTITUTIONS.

The Arkansas Industrial University, at Fayetteville, is a State institution for white students, endowed with the national land grant. It combines classical, agricultural, mechanical, and normal departments. Since the importance of special training for teachers is recognized, efforts are being made to increase the efficiency of the normal training in this institution, and also in the branch normal college at Pine Bluff for colored students. There are four other collegiate institutions in the State—viz. Arkansas College, Batesville; Cane Hill College, Boonsborough; Judson University, Judsonia; and St. John's College, Little Rock—all admitting women to their privileges.

BENEFITS OF THE PEABODY FUND.

The disbursements from the Peabody Fund have been of incalculable benefit in the development of free schools in the South. From 1868 to 1878, inclusive, Texas received $26,300; Louisiana, $63,428; and Arkansas, $66,200 from this source.

It would be absurd to apply to these States standards derived from the old, populous, wealthy, and thoroughly-organized communities of the East. Imperfect and irregular methods of report make it impossible for their educational statistics to be regarded as anything more than approximate estimates; it is from the consideration of general conditions, rather than from the study of details, that we can determine what has been accomplished and read the promise of the future.

The project to push forward the Texas Pacific Railroad, for which purpose a New York syndicate representing a vast amount of capital has signed a contract, will undoubtedly give a great impulse to education and all other enlightening influences in our South-west territory.

MISSOURI.

Missouri presents a somewhat anomalous educational record. Her school traditions date from her settlement; her governors from 1826 to the present time have with great unanimity and earnestness urged upon the attention of legislatures the truth that the highest welfare and prosperity of all commonwealths depends upon the education of the masses; a majority of the people are in favor of a high order of public schools, but some of the most prominent citizens, especially in the southern portion of the State, have been opposed to free education, and their influence has retarded its progress. So far as the rural districts are concerned, Missouri is scarcely in advance of the States immediately to the south, while the school system of her metropolis has engaged the attention of all educators in the United States and Europe. Indeed, St. Louis, the third manufacturing city in the Union and the greatest railroad-centre in the world, may justly claim as a third distinction the peculiar excellence of her schools.

EDUCATION IN THE COUNTIES.

The defective school law has been the chief disadvantage in the country districts. The county commissioners and county clerks must supply the statements upon which the Legislature makes up the estimates of appropriations, but county school-accounts are not kept separate from other entries, and no one knows or is responsible for the disposition of funds drawn out on warrants; hence the returns from the districts are a confused mixture of guesses, contradictions, and miscalculations, from which it is impossible to deduce any just estimate. A single incident will illustrate the prevailing irregularities. The president of a certain school district, in seeking an official statement of the amount of money in hand to the credit of his district, insisted that there were thirty dollars more than appeared on the official record. A heated controversy ensued. The clerk maintained that the record was correct, when the director excitedly exclaimed, "I know better, for I've got it in my pocket," and forthwith produced the amount, which he had drawn on a warrant against the "incidental fund" six months before, of course without any legal authority. The State has also suffered from the lack of well-trained teachers. As a consequence of the improvidence in these respects, there exist only about three hundred well-organized schools against 9700 at loose ends; but fortunately both evils are at present well understood, and judicious efforts are in progress for their correction. Normal institutes have been conducted with great regularity throughout the State since 1876. Five normal schools are in operation, besides normal departments in colleges, and the results are apparent in the general improvement of instruction in the elementary grades. One of the most important normal departments is that of Lincoln Institute, at Jefferson City, which fits colored students for teachers.

There is no distinct recognition of high schools in the State law, but they exist in some places through the discretionary action of school boards, and the Legislature at its last session appropriated $114,000, over and above what is expended for high schools in towns and cities, for the support of higher education in the State.

CITY SYSTEMS.

An examination of the school reports of the large cities shows that they are stimulated by the example of St. Louis. Kansas City has been particularly active; in 1867, when the board of education was established, there was not a public school building in the city; now there are nine. The course of study is well defined, and embraces seven years, having its culmination in the central school, which gives a mathematical course through geometry and trigonometry, and a classical course similar in extent to that of academies. The enrolment for the last year in the public schools of Kansas City was 4612, with an average daily attendance of 2669. The number of teachers employed was 59, and their salaries amounted to $3405 per month. The rate of school tax on the assessed valuation of $140,000 was four mills.

SCHOOLS OF ST. LOUIS.

The educational history of St. Louis dates from 1817, and is adorned with the names of many able men, from Senator T. H. Benton, who was a member of the first board, to the present superintendent, W. T. Harris, LL.D. To the latter gentleman must be attributed the present superiority of the St. Louis schools, as well as the influence the city exerts in all the current educational movements and discussions. His task has been one of unusual difficulty, because the school population increases much faster than the income from taxable property.

In 1838 there were 200 pupils in the free schools, which number had increased to 55,995 in 1879, for whose accommodation there were 107 schools, with a corps of 1056 teachers. The schools ascend by regular gradations to the high and normal schools, which fitly complete the series. Thirty-four evening schools supply excellent opportunities to young people who work during the day. The experiment of teaching German in the day schools has evidently met the approval of a large proportion of the parents, nearly one half of the pupils enrolled having taken the study. The Public School Library has outgrown its original limits, and is now open to the general reader. The value of public-school property is $2,821,596; the salaries of teachers range from $650 in the lowest grade to $2600 for principals of high and normal schools.

PRIVATE SCHOOLS OF MISSOURI.

Of the number of pupils enrolled in private schools in Missouri it would be impossible to give an estimate; many such schools, colleges, academies, and seminaries are well supported in all parts of the State. Nearly all the higher institutions of this class are chartered, and a very cordial feeling exists between them and the public schools. One of the most important of the recent foundations is Drury College at Springfield, occupying a commanding site among the hills of the Ozarks. It is under Congregational auspices, but allows no effort for the promotion of sectarianism. It includes preparatory and collegiate departments, and is anticipating a growing want by its arrangements for musical and art culture; it is radically co-educational, and its influence penetrates Arkansas, Southern Kansas, and the Indian Territory.

Washington University, at St. Louis, founded in 1853, has recently received an endowment fund of $27,000, to be used for the support of a system of popular lectures. This university includes a polytechnic school; women are admitted to its privileges.

STATE UNIVERSITY.

The Missouri State University was founded on the admission of the State by a grant of 40,080 acres of land. The gift of $117,500 by the citizens of Boone county secured its location at Columbia. The university campus, upon which the most prominent buildings are grouped, is a level tract containing twenty-two acres, laid out with graded walks and planted with many varieties of plants and grasses, which greatly enhance its natural beauty. The most important structure is the main building. This truly imposing piece of architecture is cruciform in shape, of massive style, three and a half stories high, and faced by a colonnade vestibule consisting of six Ionic columns twenty feet in height. The whole is surmounted by a magnificent dome, which towers upward to the height of one hundred feet; from the summit the eye roams over a wide expanse of beautiful landscape. This building is occupied by the law, medical, and literary societies. The other buildings are—the observatory, which contains a fine telescope and other apparatus; the English and art school, president's dwelling, and Science Hall, all of which are of pleasing design and well adapted to their uses.

The buildings and grounds of the Agricultural College are situated about a mile and a half from the campus. The School of Mines and Metallurgy, which is a department of the university, is situated at Rolla, Phelps county.

The university embraces two groups of schools—viz. the academic and the professional.

KANSAS, IOWA, MINNESOTA.

Kansas, Iowa, and Minnesota may be grouped in a single class with reference to education. Their people are a unit on the school question; they believe in the free system of graded schools, forming an unbroken chain from the primary class to the university; in efficient supervision; in special training for teachers; and in equal school facilities for both sexes. They have brought their precedents from the East, but they have not been content to remain mere imitators; there is a spirit in the conduct of the schools, in the public discussion of educational questions, and in the ready assimilation of new principles which corresponds to the character of the people and stamps the schools as "Western."

INSTRUCTION OF TEACHERS.

The teachers' institutes held annually in all the districts are conducted with great zeal and intelligence; the people gather to them in company with the teachers and officers, and social cheer sets all hearts aglow with enthusiasm for a common interest and with conscious mutual sympathy. One of the most frequent topics of discussion is the hygienic relation of intellectual pursuits; it is evident that *mens sana in corpore sano* is a fundamental article in the Western school creed.

INCREASE OF SCHOOLS.

Great as is the increase of school population from immigration, school accommodations appear to increase proportionately. The primitive log school-houses are rapidly being replaced by more pretentious and enduring structures; thus, in Kansas 3475 frame buildings, 157 of brick, and

642 of stone, and in Iowa 9596 frame, 650 brick, and 244 of stone, attest the progress of architectural reform, leaving only 322 log houses as monuments of the historic past.

The present status of education in these prairie States is perhaps best expressed in the following statistical summary of the latest estimates.

STATISTICAL SUMMARY.

The legal school age is the same in the three States—viz. five to twenty-one years. The estimated school population of Kansas is 266,575; of Iowa, 575,474; of Minnesota, 271,428. The enrolment in the public schools of Kansas is 177,806; of Iowa, 428,362; of Minnesota, 167,825. The average daily attendance in Kansas is 106,932; in Iowa, 256,913. In Kansas there are 5136 public schools, with 6359 teachers; in Iowa, 10,566 schools, with 13,023 teachers; in Minnesota, 3280 schools, with 4872 teachers. The average salaries vary but little; in Kansas, these are for men, $33.68 per month, for women, $27.10; in Iowa, for men, $33.98, for women, $27.84; in Minnesota, for men, $34.65, for women, $27.75. The available permanent fund in Kansas is $2,288,391, and the estimated eventual amount $10,000,000. In Iowa the available fund is $3,468,799; in Minnesota, $3,859,964.

ILLUSTRATIVE EXAMPLES.

The educational activity thus graphically tabulated is by no means confined to the larger towns; the record of almost any town or county, taken at random, epitomizes the entire history as faithfully as a single horizon of Prairie-land pictures the characteristics of the illimitable expanse. Thus, Monticello in Iowa possessed in 1873 an old wooden building in which 238 pupils could be gathered for a promiscuous shooting of young ideas; in 1877 this was replaced by a fine building costing $20,000, wherein 480 pupils assembled for the orderly and progressive exercises of a graded school. County reports sparkle with such items as this from McLeod, Minnesota: "Clerks have learned to make the two sides of their financial statements balance; returns from teachers become more explicit and reliable; several new and comfortable school-houses have been built, old ones reseated with patent desks, and furnished with maps, with the 'Unabridged Dictionary,' even with apparatus; and the school term has been lengthened in the several districts." There are, of course, shadows on the picture; there are districts in which the extreme brevity of the school session makes it impossible to secure any other than a mere itinerant teacher; there are log school-houses through which "the winds of heaven" blow "too roughly;" there are dead, mechanical teaching, waste of school money, and examiners who decide that a candidate will *du*, and order up a "'stifkit." Such, however, are exceptions, not types.

PROVISIONS FOR HIGHER EDUCATION.

It is noticeable also that while elementary schools have been the first care of these States, there is no disposition to limit public education to the three R's. At the last session of the Legislature of Minnesota a law was passed making provision for higher education substantially as follows: Certain public graded schools shall receive four hundred dollars annually upon condition of providing instruction in all branches prescribed as prerequisites for admission to the collegiate department of the University of Minnesota.

In Iowa legal provision is made for the establishment of free county high schools in counties having a population of two thousand inhabitants, if a majority vote of the electors can be secured. Such schools are to be sustained by county taxes not to exceed in one year five mills on the dollar of taxable property, including expenses of building, or two mills when only teachers' wages and contingent expenses are to be provided for. Up to the close of 1878, however, the high school in Guthrie county remained the only one.

In Kansas there are about sixty high schools or higher departments of graded schools, of which five are approved by the University of Kansas as having courses, English, scientific, or classical, which would entitle them to send students to its classes.

NORMAL DEPARTMENTS.

Normal schools and normal departments evince the determination of the people to have teachers specially prepared for their responsible work. Private colleges find it expedient to establish such departments. At Cedar Falls, Iowa, there is an efficient State normal school. Kansas established a State normal at Emporia four years after its admission as a State.

The three normals of Minnesota—at Winona, Mankato, and St. Cloud—came into existence under the law of 1858 providing for the opening of such schools in any community that should donate the sum of five thousand dollars for the purpose within certain specified terms. The State has made annual appropriations to these, varying from five to ten thousand dollars for each. Located almost two hundred miles apart, each of these schools has a territory tributary to itself as large as the New England States.

THE STATE UNIVERSITIES.

Public education is crowned by the State universities. They give force and breadth and purpose to intellectual life; they dignify labor by disclosing its relations to scientific principles; and by the instruction and practice they afford in agriculture and domestic industries they preclude within the range of their influence those perplexing conditions which have ensued where abstract subjects have been the sole concern of the schools. Preparatory industrial schools will grow side by side with the feeders of the mathematical and classical departments. Having their origin in the land act of 1862, the universities have in each instance received liberal appropriations from their States. The value of the productive funds of the Iowa University is about half a million, and of each of the others about $250,000. These universities include preparatory, normal, and collegiate courses and a law department.

The Kansas University occupies a fine building erected by the city of Lawrence. It is built of native limestone, and contains fifty-four rooms, including a spacious audience-room ninety-four feet by fifty-six. The departments of chemistry, physics, natural history, mechanics, engineering, and drawing have each a suite of rooms, consisting of a lecture-room, a laboratory-room for beginners, a laboratory-room for advanced students, and a room for apparatus and consulting library. In the natural history rooms there are more than fifty thousand specimens of beasts, birds, insects, and plants, largely representing the animal and vegetable life of the Mississippi Valley, and the cabinets of geology and mineralogy are richly furnished. Since the opening of the university 1702 students have been enrolled, representing both sexes in nearly equal proportions.

Domestic economy and industry is made a special feature of the agricultural department of Iowa University. The college can make the proud assertion that "every girl in the junior class has learned how to make good bread, weighing and measuring her ingredients, mixing, kneading, and baking, and regulating her fire. Each has also been taught to make yeast and bake biscuit, puddings, pies, and cakes of various kinds; how to cook a roast, broil a steak, and make a fragrant cup of coffee; how to stuff and roast a turkey, make oyster soup, prepare stock for other soups, steam and mash potatoes so that they will melt in the mouth; and, in short, to get up a first-class meal, combining both substantial and fancy dishes in good style. Theory and manual skill have gone hand in hand. Vast stores of learning have been accumulated in the arts of canning, preserving, and pickling fruits, and they have taken practical lessons in all the details of household management, such as house-furnishing, care of beds and bedding, washing and ironing, care of the sick, care of children, etc." Her lady graduates promise to meet the ideal of the poet—

> "Creatures not too bright or good"

for the preparation of

> "Human nature's daily food."

The Minnesota University, situated at Minneapolis, celebrated the Centennial year by the occupation of its new buildings. The library, which is the largest in the State, is at length properly accommodated. The agricultural department is conducted with great vigor and success, the experimental farm and the plant-house furnishing abundant opportunity for the practical application of those arts which make "joyous harvests." While the classical student turns the soft phrases of the *Georgics*, the agricultural student follows their injunctions; he "cuts down reddening Ceres in the noontide heat, and in the noontide heat threshes out the parched grain;" "he softens the wild fruits by cultivation, and learns the culture proper to each kind." Since 1873 the university has conferred degrees on 57 graduates.

PRIVATE SCHOOLS.

Private schools have contributed largely to the intellectual progress of these communities. In 1878 the total number of children in such schools in Minnesota was not less than ten thousand. The proportion appears to be nearly the same in Iowa, but is less in Kansas.

RELIGIOUS EDUCATIONAL INSTITUTIONS.

The various religious denominations have been very active in the work. Besides many secondary institutions, they support sixteen colleges in Iowa, seven in Kansas, and four in Minnesota. Space does not admit a detailed account of many of these excellent enterprises, but, as they are similar in general purpose, scope, and methods, the character of all is better understood by the particular description of a few.

Griswold College, Davenport, Iowa, under Episcopal auspices, has a beautiful situation upon an elevated bluff. It has a fine building and extensive grounds, and is furnished with a library of six thousand volumes, with superior philosophical and chemical apparatus and with extensive cabinets. It has been in operation twenty years, and has had

23 graduates in arts, 4 in science, and 22 in theology. The total of necessary expenses in the art or science departments is $181.50, and in the theological $125.18 per annum. The bishop of Iowa is ex-officio president of the board of trustees.

Cornell College, Mount Vernon, Iowa, is a Methodist Episcopal college for both sexes. The courses of instruction are extensive, and it enjoys a fine patronage. It numbers several ladies in its faculty.

St. John's Seminary, at St. Joseph, Stearns county, Minnesota, was founded in 1857 by members of the Benedictine Order. It has a romantic situation on the shores of a limpid lake; the buildings are massive structures of brick and granite. The commercial college is an admirable feature of the institution.

Minnesota Academy, Owatonna, is a centennial offering of the Baptist denomination to the cause of Christian education. Its endowment fund is $150,000. Though so young an institution, it numbers nearly two hundred students of both sexes.

The United Brethren have a flourishing work at Western College, Western Iowa, and another at Lecompton, Kansas.

In addition to the professional training offered by the State University, Kansas has departments of theology in two institutions. Iowa has theology in seven, law in two, medicine in two; Minnesota has three theological schools. Commercial and business schools are reported, indicating the growing demand for trained clerks and skilful accountants, as in Davenport and Dubuque, Topeka, St. Paul, and Minneapolis.

The columns of the press are freely open for reports of schools and their interests, which are thus kept in closest relation with all the vital concerns of daily life.

NEBRASKA.

The school history of Nebraska is much older than the State. Previous to her admission in 1867 there had been an earnest effort to organize a system of public schools, and a report of the educational status had been published. One hundred and eight public schools had been established, about three thousand pupils enrolled, and an attendance of forty-one per cent. secured; the value of the Territorial legacy of school-houses to the State was $9,188.22. Private schools did more to give standards and impart an elevated tone to education than the early public schools.

During the winter of 1866 the citizens of Peru, a small town on the Missouri River, sixteen miles below Nebraska City, commenced the enterprise which eventually gave them the State Normal School. They raised by subscription about eight thousand dollars, and erected a school building eighty feet long by forty feet wide, and three stories high. In the fall of 1867 this building, with sixty acres of land, was deeded to the State, to be used as a State normal school. In the summer of 1866 the people of Brownville, and also those of Nebraska City, commenced the erection each of a large high-school building. The building at Brownville cost the city about sixteen thousand dollars, that at Nebraska City about thirty thousand dollars. These were the first school buildings of any considerable size or value in the State. The school buildings generally throughout the Territory were miserable hovels, and their furniture was of the plainest kind. In the fall of 1866 a company of those interested in the cause of education met at the high-school building in Nebraska City to discuss the important features of a law to be presented to the next Legislature. After considering many points, it was agreed to call a State educational convention, to meet at Omaha about the time the Legislature convened. This convention met pursuant to call January 7, 1867, and after several days spent in discussion adopted resolutions asking the restoration of the school commissioner and county superintendents, the establishment of a State normal school and a State university, and recommending a number of wise provisions that have since been adopted.

At the session of the first State Legislature, held in June, 1867, the State Normal School was established, and a grant of 12,800 acres of saline lands was made for its future support. The school was commenced October 24 of the same year.

PRESENT CONDITION.

The subsequent record shows steady and uninterrupted progress. In 1869, Omaha commenced the erection of her high-school building, which has since been completed, and is one of the most magnificent in the country. Other cities were stimulated by her example, and soon school-house building became a mania throughout the State. Nebraska can boast of as many fine buildings for her population as any State in the Union. Unfortunately, however, she has incurred a heavy debt in consequence. Her progress has not been limited to the erection of school-houses; with an estimated school population of 86,191, she has 59,966 enrolled in public schools; 1468 men engaged in teaching and 1893 women, the former at average salaries of $37.14 per month, and the latter, $32.84. Her available school fund is $1,318,044, and prospective permanent fund about

$15,000,000. There are high schools at Ashland, Beatrice, Brownville, Lincoln, Omaha, and Pawnee, and the State Normal School at Peru.

STATE UNIVERSITY.

The State University was opened in 1871, and is rapidly developing according to the best models. Industrial education has distinct recognition in all the educational plans of the State. It would be difficult to find a clearer, more explicit, or more pungent discussion of the claims, the purposes, and the methods of this important departure in education than the address by Prof. S. R. Thompson, delivered at Representative Hall, Lincoln, Nebraska, January 22, 1879, which was reported in full in the *Daily State Journal* of the following morning. Its emphatic declaration of the necessity of industrial education may be interpreted as an expression of the future policy of the State.

THE TERRITORY BEYOND THE MISSOURI.

In that immense territory stretching from the Missouri to the Sierra Nevadas, where Nature reigns supreme, art and industry and education have done little more as yet than to gain a foothold. The scenery and hunting-grounds attract an endless stream of tourists and adventurers; the grassy plains, "the veins for silver," and the "places of gold" determine the final abodes of the permanent settlers. Wherever a community is formed and family life excites the nobler aspirations of the soul, there the school springs spontaneously into existence. Denominational and private enterprise has given the most positive direction and character to the intellectual beginnings, but voluntary school taxes and public schools, imperfect and feeble though they may be, show the determination of the people to maintain education as a public trust.

COLORADO.

Colorado claims the proud distinction of having entered the sisterhood of States with a better developed and more liberally supported school system than was possessed by any other State at the time of admission into the Union. She has a present school population of about twenty thousand, more than half of whom are enrolled in the public schools, and the average daily attendance is about thirty-three and one-third per cent. of the entire number. The funds from the national land grant contribute as yet very little to the support of the schools. The average school tax sustained by the State is, including general and special taxes, five mills on the dollar.

The schools are in their formative period, and their condition and results cannot be set forth in any general expression or estimates, excepting those of Denver. In this city the schools are classed as primary, grammar, and high, and all pupils above the third primary grade are allowed to study German in addition to the usual English branches. The annual expenditures for the Denver schools are about $60,000.

STATE UNIVERSITY.

The University of Colorado made a promising beginning in 1877. The State Agricultural College, at Fort Collins, and the State School of Mines, at Golden, are doing excellent work in preparing students for intelligent efforts in developing the resources of the State. School libraries form an important feature of the growing system.

SALARIES OF TEACHERS.

Both this State and Nevada occupy a very advanced position with reference to the education of women and the justice of paying teachers according to the quality and responsibility of their positions, rather than according to sex. The average monthly salaries paid to male teachers in Colorado is $50; to females, $47. About six hundred teachers are employed in the public schools.

NEVADA.

There is not a town in the State of Nevada in which there is a lack of general interest in the public schools, and more money can be raised and more interest excited in this than in any other public matter. It has been difficult to systematize the work, because the population is so located that some districts have a fair school population, while others have but four or five children; hence, so long as the public money was distributed among the counties *pro rata*, it was impossible to secure equal educational advantages to all the children. The amended school law directed that twenty-five per cent. of all the appropriations from the State and county school fund should be apportioned equally to each district for every teacher assigned to it, upon the basis of one hundred census children or fraction thereof, and all school moneys remaining on hand after apportioning twenty-five per cent. should be divided among the several districts in proportion to the number of children from six to eighteen years old. In the opinion of the State superintendent the cause of education has been materially advanced by this adjustment. The compulsory clause embodied in the school law has proved practically a dead letter.

The latest financial returns from the various funds—viz. State and general-school fund and State university fund—give as the total balances, $143,178.34.

PRESENT CONDITION.

The specific information given in the last report of the State superintendent affords the best conception of the position attained. The number of children between four and twenty-one years of age is 11,850; the number enrolled in public schools is 7612, of whom 296 are below the legal age, six to eighteen years; the enrolment in private schools is 1061, leaving 1976 between six and eighteen not attending any school. The average daily attendance in the public schools is 4666; average duration of the schools is seven months and thirteen days. The schools are classified as 97 primary, 11 intermediate, 54 ungraded, 18 grammar, and 5 high. The number of male teachers is 45, at an average salary of $106; of female teachers, 124, at an average salary of $84 per month. Of the sixteen new school-houses erected during the past two years, the most expensive are at Gold Hill and Elko.

TEACHERS' INSTITUTES.

The first session of the State Teachers' Institute of Nevada was held at the Capitol, in Carson City, April 22, 1878. The interest in it is shown by the fact that although the expenses exceeded the $100 allowed, the balance was easily made up by the commissioners of Storey and Ormsby counties and by citizens.

STATE UNIVERSITY.

The university provided for by law, and established in its preparatory department, still awaits the fuller development which in a State with a vast territory and a sparse, unsettled population must come by slow degrees.

DAKOTA, MONTANA, IDAHO, WYOMING, AND WASHINGTON TERRITORIES.

In the Territories ranging along the northern line of the country, education shows beginnings similar to those from which have grown the results particularized in the States farther east. Yankton, Dakota, has a good graded system in operation; in Idaho private schools are at present the main dependence. Montana makes very liberal appropriations for school purposes, and has some excellent school-houses built—notably, one at Bozeman and one at Butte, costing in the aggregate $25,000. Deer

Lodge county leads the State, the citizens having subscribed $18,000, effected an organization, chosen trustees, selected a site, and commenced the building for a collegiate institute. The Legislature of Washington Territory has appropriated $1500 annually for two years for a university, and created forty-five free scholarships in the same. There is a Roman Catholic college at Vancouver. Cheyenne and Laramie, Wyoming, have each a costly and commodious school building, and the schools that exist are reported to be in excellent condition. A compulsory law is in force, and a wise provision has been made for creating school libraries by authorizing the qualified electors of a district to vote a sum not exceeding one hundred dollars annually for the purchase of books.

NEW MEXICO AND ARIZONA.

The Territories on the southern line, New Mexico and Arizona, represent the opposite extreme. Colorado College is favorably situated for the work of education in this section. It occupies a commanding position in that great block of territory comprising Colorado, New Mexico, Utah, and Arizona, exceeding by fifty thousand square miles the extent of the thirteen original States. On the south is a mixed population of ten thousand Americans, twenty thousand Indians, and one hundred thousand Mexicans. The dearth of educational facilities in this immense region is scarcely credible. Large and populous villages are wholly destitute of schools, communities with a population of a thousand souls have perhaps two months' schooling in the year, and even at that many teachers employed can scarcely read and write. Adverse influences are insidiously working to secure control of educational interests. To the west is polygamy, antagonizing all that is best in American liberty and all that is purest in society. This college has pushed into the field by establishing schools auxiliary to the college at Santa Fé and Salt Lake City. The work of the college proper is wisely adapted to the wants and the special resources of its section. It comprehends at present three general courses of study—viz. English and normal course, preparatory classical course, and the college course proper. As it has been made a station of the United States Signal Service, students from the higher classes are formed into a corps for the study of meteorology and for practice in the use of instruments according to the regulations of the Signal Service. The price of tuition has been placed at twenty-five dollars a year, with the design of making the college practically free to all.

The ignorance of the Mexicans reflects little credit upon the Catholic system of education which has developed in New Mexico and Arizona without "let or hinderance." These two Territories, together with Colorado, belong to the Church province of Santa Fé. The Las Vegas College is the centre of the Jesuitical influence, and Santa Fé a great stronghold of the Church. In the "Sodality of the Young Ladies of the Cathedral" the daughters of the rich traders and planters are taught Spanish and Ave Marias and the Church legends and St. Cecilia's art and fancy-work, while their brothers learn the humanities and kindred lore of the Middle Ages in the "Sodality of the Boys." The mission-stations, scattered here and there in sunny valleys, add picturesque effect to the landscape, but, it is to be feared, diffuse an enervating influence on the social forces. In these quaint, isolated retreats some zealous priests have doubtless lived and wrought, whose memories are as fragrant as the flowers that grow in luxuriant profusion in the gardens which they tended with more success than they did those immortal powers which they professed to cultivate. The life, the pursuits, the education represented in each and all of these establishments are at variance with the age and the country, and must fade into oblivion before the advancing power of earnest, practical modern education.

UTAH.

The Utah school department has been, until very recently, one of the Mormon close-corporation affairs which an unbeliever might not scrutinize too closely. But the Gentile population having at last reached a large minority, Gentile pluck and enterprise have established a claim upon the school fund, and are resolute to divert at least a fair proportion of the public moneys to the interests of civilization and decency. About ten years ago the prominent Christian sects began their mission-work in Utah, and though all schools independent of "the Church" have to endure the anathemas and slurs and violent opposition of the hierarchy, there are twenty-five schools maintaining under denominational auspices the cause of Christian education. Six are Methodist, five Episcopal, twelve Presbyterian, and two Catholic. They enrol about two thousand pupils and own seventy thousand dollars' worth of school property. Besides the 327 district schools reported, there are Deseret University, the Brigham Young Academy, the academy at Provo, one at St. George, and about twenty-five other private schools in good and regular standing with the "Mormon Church." No effort will be spared to rescue the public schools from the degrading influence of Mormonism, and to advance them to an equality with the schools of the East. The note of warning sounded to the priesthood through the papers, the business unions, the churches, and the schools of the Gentiles is, "We are here, and we have come to stay."

INDIAN TERRITORY.

The provisions for education in Indian Territory make the one bright page in the dark record of our Indian policy. The school facilities in that Territory and other Indian reservations are presented in the following extracts from the reports of the Indian Bureau:

"SCHOOLS.

School buildings on Indian reservations	366
Boarding-schools on Indian reservations	60
Day schools	270
	696

"TEACHERS.

Men teaching among the Indians	200
Women teaching	237
	437

"INCOME AND EXPENDITURE.

Received from government, $209,337; tribal funds, $81,989; other sources, $46,053	$337,379
Expended for salaries, $194,413; other expenses, $142,966. .	337,379

"SCHOOLS OF THE FIVE NATIONS.

"As far as can be ascertained from the records of the Indian Office, the schools of the nations inhabiting the Indian Territory are substantially as reported in 1876—namely, among the Cherokees, 75 common schools, held for ten months in the year, with two commodious schools of higher grade, a manual-labor school, and an orphan asylum; among the Creeks, 28 public day-schools, 2 manual-labor schools, and 5 mission boarding-schools, besides provision for educating eighteen young men in the schools of the States; among the Choctaws, 54 day schools, 1 boarding-school with about 50 pupils, and several private schools sustained by tuition fees; among the Chickasaws, 13 district common schools and 4 high schools; among the Seminoles, 5 ordinary schools and 1 academy or boarding-school, under the supervision of the Presbyterian Board of Home Missions.

"Among the Cherokees, and probably among the others, no person can be employed to teach a public school without passing a satisfactory examination before an examining board, and producing a certificate of qualification based upon the result of such an examination."

These extracts are given thus fully to redeem, so far as they may, our national reputation from that blemish which has been incurred by our many and flagrant oppressions of this unhappy people.

OREGON.

When we consider that California has developed on the Pacific coast a school system not inferior to that which is the pride of the Atlantic States, we are not surprised to find in the neighboring State of Oregon abundant educational promise. The condition of elementary instruction is affected by the obstacles incident to a new country, but progress is there assured by the school law and by public enthusiasm.

PRACTICAL EDUCATION.

Normal and industrial education are at present subjects earnestly discussed in popular assemblies and in the daily papers. In a recent address of the Oregon State Teachers' Association to the people of Oregon the importance of establishing three normal schools in the State was urged, and it was determined that meanwhile there should be held annually county teachers' institutes for the encouragement and instruction of teachers.

CITY SCHOOLS.

Portland and Salem can show many excellent graded schools.

PARK SCHOOL, PORTLAND.

The Park school-house recently erected in the former city is a model of beauty and convenience. The building is one hundred and forty feet long and ninety feet wide, and two stories high above the basement. There are twelve rooms, six in each story. In the north and south divisions of the building, in both stories, are suites of two rooms connected by sliding doors, each room twenty-eight by thirty-six feet, and sixteen feet high. In the centre are two rooms on each floor of the same size as the former. Two halls, sixteen feet wide, run through the edifice east and west, and are connected at the centre by a cross-hall sixteen feet wide, the whole forming a letter H. Four broad stairways with easy ascents lead to the second story. On one façade extend two massive porches, from each of which a broad stairway leads to the basement.

Cloak- and wash-rooms and an office and library complete the accommodations. The entire finish of the building is of finest Oregon ash; the stairways are of ash; the rails and posts of walnut; the deadened floors are of fir, and the doors are of red cedar. The ventilation of the building will be perfect by reason of the arrangement of the windows and the introduction of ventilating-shafts. The cost will be about twenty-four thousand dollars.

THE UNIVERSITIES.

Oregon University held its second commencement June 19, 1879, graduating a class of three lady and three gentleman students. It is on the plan of the State universities already described; its total receipts from all sources for the year 1879 were $9772.50, and total expenditures $8317.03. The university was located at Eugene City in consideration of that city's furnishing suitable grounds and building. The cost of the latter when completed will be upward of seventy-five thousand dollars. The State Agricultural College at Corvallis is doing a fine work in scientific and industrial branches.

Willamette University, Salem, has a medical department, which is the only professional school in the State.

CALIFORNIA.

The ordinary student of geography learns to regard California, by virtue of her climate, her scenery, her exuberant vegetation, and the exhaustless treasures of her mines, as one of the wonders of the modern world. The stories of her business enterprise and facilities, and of her "bonanza princes," are as dazzling as the splendors of an Arabian tale, but, happily, the development of moral and intellectual conditions among her people has not been paralyzed or eclipsed by this unwonted material prosperity. We are not left to conjectural estimates for knowledge of her school interests, since the candor and accuracy of the State and city reports on this subject are quite as marked as any feature of her educational history.

Since 1855 the number of her public schools has increased from 227 to 2743; of her census children, from 26,077 to 216,404; of the number in attendance upon public schools, from 13,000 to 144,806; and the amount paid by the State to teachers, from $181,906 to $2,285,733.

For a better understanding of her present position it would be necessary to consider certain comparisons between this and other States, keeping in mind that California is four years younger than any of the other States referred to, excepting in connection with the first item.

A majority of the States afford from fifteen to seventeen years' tuition in the public schools; the lowest limit is in Massachusetts and Rhode Island—viz. ten years. California furnishes twelve years'. In the average duration of school days to the year she ranks as the seventh State; in proportion of money expended *per capita* to daily average attendance, as the fourth. In no other State are teachers so well paid as here, and so justly according to service, the average salary per month for male teachers being $84.93; for female teachers, $68.01.

EXPENDITURES.

Since 1852, the year of the first State school tax, the people of California have devoted to the cause of public education, in money—

For public schools, about	$33,743,819.84
“ State Normal school, about	566,600.00
“ State University, “	4,150,000.00

The sources from whence the expenditures are met are the interest on the permanent fund and taxation. The former affords but a very small proportion of the entire amount, as will be seen from the following statements: The total cost of the schools for the year ending June 30, 1877, was $2,749,729, of which sum about $2,400,000 was raised by taxation—viz. $1,260,000 by State tax, and the remainder by county, city, and district taxes. The proportions are about the same for 1878 and 1879. The tax levied in 1878 for the general fund for the current fiscal year, out of which are defrayed all the expenses of the executive, legislative, and judicial branches of the government, was $1,320,000, or $1,080,000 less than the tax cited above. The people evince no disposition to curtail the school appropriation, but they are determined to have it managed on the strict business principle of adequate returns for the investment.

NEW SCHOOL LAW.

The educational clause of the new constitution, ratified by the people May 7, 1879, makes some changes which have been the subject of intense discussion. The most radical of these is that which relegates to local boards the determination of the qualification of teachers and the selection of textbooks—a virtual abandonment of the “State system”—and the section regulating the status of high schools. The latter is so pertinent to that “high-school question” over which newspapers, magazines, and conventions have been waxing warm and furious that we quote it in full: “The public-school system shall include primary and grammar schools, and such high schools, evening schools, normal schools, and technical schools as may be established by the Legislature or by municipal or district authority; but the entire revenue derived from the State school fund and the State school tax shall be applied exclusively to the support of primary and grammar schools." Thus in one comprehensive act California has settled for a time her policy with reference to the most distracting of the debatable issues in public education.

SUPERVISION.

It is very largely to an efficient system of supervision and the character of the men who have held the trust that California owes the progress of her schools, particularly in the rural districts. The State and county superintendents have been united in their support of the normal schools and in untiring efforts to render the teachers' institutes held in the several counties popular and efficient.

NORMAL SCHOOL.

The State Normal School was established in 1861 at San Francisco, and moved in 1872 to San José, where a magnificent building had been erected for its accommodation at a cost of $250,000. It has an excellent library and a rapidly-increasing natural-history collection. Five hundred and fifty teachers have graduated at this school, of whom a large proportion are now teaching in the State. The number of pupils for 1879-80 is 548. The faculty consists of nineteen professors and instructors. The annual appropriation for its support is about $33,000.

THE UNIVERSITY.

In 1853, Henry Durant, a graduate and ex-tutor of Yale College, opened a "college school" in Oakland, which grew into the College of California. After the acceptance by the State Legislature of the national grant of 1862, the property of the college was offered to the State for the proposed institution, and the college merged into the University of California.

The university has reached the ideal standard of its projectors, having full departments of law and medicine, courses in colleges of agriculture, mechanics, and engineering, and affiliated colleges of dentistry and pharmacy. The foundation of an art college has been laid in the gift of an art collection, with $25,000 in money, to which the State has added an equal sum. Additional donations are the property of the Toland Medical College, given by Dr. Toland; the endowment of the law college by Judge Hastings, and of the dental college by Dr. Cogswell.

The members of the several faculties are men of ability, and include the names of several gentlemen who have brought European reputations as teachers and scientists to this new field.

PRIVATE SCHOOLS.

The percentage of children attending private schools has naturally decreased with the progress of the public schools, but they have steadily improved in character, and many of them reflect an honor upon the State of which she is justly proud. The enrolment in private schools for 1879 was 15,432. In the last report of the California School Board twenty-five of these are specially mentioned, of which the most noted are Santa Clara College, under the exclusive control of the Jesuit Fathers; the Pacific Methodist College, at Santa Rosa, co-educational, as are all under that denomination, and conducted upon the broadest and most liberal basis of general usefulness; and Mills Seminary, at Brooklyn, Alameda county, which ranks with the best modern colleges for the higher education of women. The Kindergarten School at Berkeley, established by Miss Emma Marwedel, is a favorite institution, and from it have originated other flourishing schools of the kind, as well as a widespread interest in the character and purposes of the training.

SCHOOLS OF SAN FRANCISCO.

According to the latest estimates, San Francisco is the sixth city of the United States in estimated school population, in the number of teachers employed in the public schools, and in enrolment and average attendance in the same, the enrolment for 1879 being 38,129, and the average daily attendance 27,075. There are in the city 60 public schools—viz. 2 high, 15 grammar, 38 primary, and 5 evening—employing 696 teachers, at salaries ranging from $600 to $4000 per year, the average monthly salary paid to male teachers in the schools being $155; to female teachers, $82.

There are school libraries in connection with 42 of the schools, containing 12,717 volumes, valued at $9302.59. The total expenditure for the schools for the year ending June 30, 1879, was $876,489.14, or sixteen per cent. of the total expenses of the city.

The year 1879 was one of great interest in the history of San Francisco schools, the cost of their maintenance having been made one of the issues in the political contest, and the investigation of the examination frauds has been for many months the chief public sensation. The result of the *exposé* was an entire change in the system of examining teachers throughout the State—a change embodied in the educational article of the new constitution.

There is a normal class in connection with the Girls' High School, but as yet no city normal school. The substitute teachers form an important class in the corps of instructors. The Board of Education employs twenty-four such to take charge of the classes of absent teachers. They report every morning at the central office, and if detailed for duty are paid by the day from $2 to $6; if detained at the office to await orders, they receive $1.50 per day.

Four grammar and three primary schools are classed as cosmopolitan, because instruction is given in them in German and French besides the usual English course; there are also "foreign classes" in certain of the schools in which non-English-speaking children are taught the English language. Seven music and four drawing teachers complete the special provisions comprehended in the system. The evening schools afford by the ordinary courses and the special classes in drawing and bookkeeping superior opportunities to young artisans and clerks. A Chinese school, organized in 1859, was discontinued in 1871, from the failure of the Chinese to appreciate the boon.

This brief outline of public education in the Pacific metropolis is sufficient to show the magnitude and efficiency of the system, and the intelligent effort made to adapt it to every class and condition of society, and the liberal appropriations for its support.

INSTITUTIONS FOR THE DEAF AND DUMB AND FOR THE BLIND.

In our review of the condition of education west of the Mississippi mention has scarcely been made of one of the most remarkable features of the great work. Eleven of the twelve States enumerated maintain public institutions for the deaf and dumb and for the blind; nor are these regarded as charities, but as an essential part of the grand scheme for securing to every child of the republic that education which is the best preparation for citizenship and the best guarantee of national prosperity.

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NORTH AMERICAN INDIANS.

BY A. B. MEACHAM, EDITOR OF "THE COUNCIL FIRE."

WHEN America was first discovered, Columbus and others who followed him supposed they had touched on the eastern coast of India, and hence the aboriginal inhabitants whom they found were called Indians. After the error was discovered the name given to the natives was retained.

The first permanent European settlement within the present limits of the United States was made in Virginia. At that time the leading traits and characteristics of the Indians were much the same as those manifested among the uncivilized Indians of our own times. Of all races who were barbarians, of whom we have any knowledge, they have in their nomadic state changed least.

RELIGION OF THE INDIANS.

The wild Indians believe in a Great Spirit; the tribes live in a state of polytheism; they have a mythology of their own, which, when applied to matter and spirit, is remarkable for its variety. To this theory or creed they refer at all times and under all circumstances. They hear the Great Spirit in the wind; they see Him in the clouds. At one time they fear and at another adore Him; and thus they make gods of the elements. The mysterious power of this Great Spirit is ever present, and in a double form. There is a benign and a malign type of this Spirit, and a continued strife for mastery between these antagonistic powers as to which shall have the control over the mind. Nature is full of minor spirits that attend both the benign and malign type. "When the eye fails to recognize them in material forms they are revealed in dreams. Necromancy and witchcraft are two of their ordinary powers. They can in a twinkling transform men and animals. False hopes and fears, which the Indian believes to be true, spring up on every side. His notions of the spirit-world exceed all belief, and the mind of the untutored Indian is thus made the victim of wild mystery, unending suspicion, and paralyzing fear. Nothing could make him more truly a wild man.

"It is a religion of woods and wilds, and involves the ever-varying and confused belief in spirits and demons, gods of the water and gods of the rocks, and in every imaginable creation of the air, the ocean, the earth, and the sky—of every possible power, indeed, which can produce secret harm or generate escape from it. Not to suffer with the (wild) Indian is to enjoy. Not to be in misery from these unnumbered hosts is to be blest."*

ORIGIN OF THE INDIAN RACE.

The most ancient history is silent as to the origin of the aboriginal race of North America. It is clearly of a very old stock. Many theories have been suggested by writers on this subject; almost every one has had something to offer concerning the origin of the primitive inhabitants of this country. But none have produced anything definite. There has been much speculation, not only as to the particular branch of the human family from which the American Indians were extracted, but as to the means by which they were transplanted from the Old to the New World. The Indians themselves could give no satisfactory information as to the origin of the race, or from whence and at what time it was transplanted to America. Some said their ancestors came from the North, others said they came from the West, others from the East, while some said they came from under the earth, and others from the regions of the air. We should not deduce from the ignorance of the Indians on this vital question their lack of intelligence in affairs generally, any further than what might be naturally expected as a result of their peculiar situation and surroundings.

In a general way, the primitive Indians spoke of a great deluge that occurred at some ancient epoch, and which covered the earth and drowned mankind except a limited number. They also spoke emphatically of a future state, and in a confused way of rewards and punishments in that state, and which were frequently allegorically represented.

THE BEGINNING OF THE GREAT CONFLICT BETWEEN THE RACES.

There is one fact in which there is agreement in all the early annals; and that is, that the first explorers and colonists who came to the "New World" were met by the native inhabitants in the most friendly manner, and such rude hospitalities as they possessed were freely extended to the strangers. The adventurers, whether Spanish, French, Dutch, or English, did not reciprocate the confidence and goodwill of the natives. They were from the very beginning exacting, overbearing, and distrustful. Indeed, they frequently acted like demi-savages toward such Indians as were in their power; and very soon the voyagers on their return trips began to carry off the natives, who were forcibly seized for that purpose, and many of whom they sold as slaves. Such conduct was calculated to, and did, destroy the confidence and goodwill of the Indians, and in time these friendly feelings gave place to distrust, hatred, and revenge. For wrongs and injuries done them the Indians retaliated. Their modes of warfare were barbarous. In these, however, they did not excel the Europeans, who in the conflicts that followed were even more barbarous than the native savages. These conflicts have continued from generation to generation even until the present period.

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* Schoolcraft.

THE NUMBER OF INDIANS THEN AND NOW.

Some writers have held that at the time of the discovery by Columbus the native inhabitants in North America were very numerous. There is no trustworthy information on which to base this opinion. The savages were wild men, living chiefly by hunting and fishing. Some tribes, in addition to the support thus obtained, did raise in limited quantities maize, beans, and pumpkins, and in certain localities gathered wild rice and roots. The tribes were generally predatory, and may be said to have had no settled homes. Those in the vicinity of the buffalo-herds followed them, and were essentially meat-eaters. Instead of being numerous, the Indian population was sparse and dispersed over a vast country. Their arms were the bow and arrow, the war-club and spear. Such as cultivated vegetables in limited quantities had the rudest kind of implements of husbandry as well as habitations. Their shifting villages each had its chiefs, and not unfrequently a number of villages in the same region had a sort of confederacy, with superior chiefs exercising authority over all. In their intercourse the inhabitants of the village or villages were on the most friendly terms. They rarely had any disputes. Their principal subjects of conversation were such as grew out of their tribal affairs and hunting and fishing. As a rule, when one spoke none interrupted him. Visitors were cheerfully received, and when a stranger took refuge among them it was an unalterable rule, a duty, to extend hospitality to him. To refuse succor or relief was a grave offence. No profane language was used. The wardrobe of the primitive Indian was scanty and made of the skins of animals.

In brief, such were the natives and their condition on and adjacent to the Atlantic seaboard at the time the first Europeans became their neighbors. As the Indians observed the ways and manners of the colonists, they were free to admit that the latter had some advantages over them in that they were possessed of the arts, but thought it strange that the white man should submit himself to laborious employments; and they were unwilling to exchange their modes of living for such as were introduced among them by the colonists. Indeed, they claimed that it was not in accordance with the design of the Great Spirit that they should do so. And they held stoutly that in their moral conduct they were superior to the refinements which the Europeans brought with them.

INTRODUCTION OF EUROPEAN LAWS.

In the attempt to found colonies in North America as well as other newly-discovered countries it was held by the Christian states of Europe that the newly-discovered country belonged to the sovereign whose subjects made the discovery, and that while exceptions might be made in favor of the native inhabitants who were Christians, such as were not Christians were regarded as proper subjects not only for conquest, but for plunder. In the contest for dominion in North America the European nations held that the Indian was a proper subject for plunder, and that it was right to seize his lands and dispossess him of his birthright. These nations introduced their own maxims, which recognized fraud and force as perfectly legitimate in the acquisition of territory.

The example set by the European states after founding their colonies in North America in dealing with the Indians was pursued by the colonies after they became independent, and the United States followed the same line of policy. In discussing the question in 1826 the Secretary of War said officially—

"From the first discovery of America to the present time one master-passion, common to all mankind, that of acquiring land, has driven, in ceaseless succession, the white man on the Indian. The latter, reluctantly yielding to a force he could not resist, has retired from the ocean to the mountains, and from the mountains to more inhospitable recesses, wasting away by suffering and wars, foreign and intestine, till a wretched fragment only survives of the numerous hordes once inhabiting this country, whose portion it is to brood in grief over their past misfortunes or to look in despair upon the approaching catastrophe of their impending doom. . . . . In the contest for dominion the milder qualities of justice and clemency were disregarded. But that contest has long since ceased in the United States, where on the one side are seen a great people, familiar with arts and arms, whose energies are increased by union and directed by an efficient government; on the other a few ignorant and divided tribes of barbarians. It is necessary for the former only to express its will to receive or enforce immediate submission from the latter. The suggestions of policy should no longer stifle the claims of justice and humanity. It is now, therefore, that a most solemn question addresses itself to the American people—one whose answer is full of responsibility. Shall we go quietly on in a course which, judging from the past, threatens their extinction, while their past sufferings and future prospects so pathetically appeal to our compassion? The responsibility to which I refer is what a nation owes to itself, to its future character in all time to come. For next to the means of self-defence and the blessings of free government stands in point of importance the character of a nation. Its distinguishing characteristics should be justice and moderation—to spare the weak its brightest ornament. . . . . It is the province of History to transmit in its pages the transactions of nations. Posterity look to this depository with the most intense interest. The fair fame of their ancestors, a most precious heritage, is to them equally a source of pride and a motive of continued good action. But she performs her province with impartiality. The authority she exercises in the absence of others is a check on bad rule. The tyrant and the oppressor see in the character of their prototypes the sentence posterity is preparing for them. Which side of the picture shall we elect? For the decision is left to ourselves. Shall the record transmit the present race to future generations as standing by insensible to the progress of desolation which threatens the remnant of this people? or shall these unfriendly characters give place to a generous effort which shall have been made to save them from destruction? While deliberating on this solemn question I would appeal to that high Providence, whose delight is justice and mercy, and take counsel from the oracles of His will, revealed to man in His terrible denunciation against the oppressor.

"In reviewing the past, justice requires that the humane attempts of the Federal government, coeval with its origin, should receive an honorable notice. That they have essentially failed the sad experience of every day but too strongly testifies. If the original plan, conceived in the spirit of benevolence, had not been fated to encounter that as yet unabated desire to bereave them of their lands, it would perhaps have realized much of the hopes of its friends. So long, however, as that desire continues to direct our councils every effort must fail. A cursory review is all that is necessary to show the incongruity of the measures we have pursued, and the cause of their failure. Missionaries are sent among them to enlighten their minds by imbuing them with religious impressions. Schools have been established, by the aid of private as well as public donations, for the instruction of their youths. They have been persuaded to abandon the chase—to locate themselves and become cultivators of the soil. Implements of husbandry and domestic animals have been presented to them. And all these things have been done, accompanied with professions of disinterested solicitude for their happiness. Yielding to these temptations, some of them have reclaimed the forest, planted their orchards, and erected houses, not only for their abode, but for the administration of justice and for religious worship. And when they have done so *you* send *your* agent to tell them they must surrender their country to the white man, and recommit themselves to some new desert, and substitute as the means of their subsistence the precarious chase for the certainty of cultivation.

LOVE OF NATIVE LAND.

"No man is devoid of this natural affection, whether he roams the wilderness or is found in the highest state of civilization. This attachment increases with the comforts of our country, and is strongest when these comforts are the fruits of our own exertions. Can it be matter of surprise that the Indians hear with unmixed indignation of what seems to them our ruthless purpose of expelling them from their country, thus endeared? They see that our professions are insincere—that our promises have been broken—that the happiness of the Indian is a cheap sacrifice to the acquisition of more lands; and when attempted to be soothed by the assurance that the country to which we propose to send them is desirable, they emphatically ask us, 'What new pledges can you give us that we shall not again be exiled when it is your wish to possess these lands?' It is easier to state than to answer this question. A regard for consistency, apart from any other consideration, requires a change of measures. Either let the Indian retain and enjoy his home, or, if he is to be driven from it, abstain from cherishing illusions we mean to disappoint, and thereby make him to feel more sensibly the extent of his loss."

By the compact between the United States and the State of Georgia, entered into in 1802, the former covenanted that as soon as it could be done peaceably and on reasonable terms the title of the Cherokee Indians to land within the limits of the latter should be extinguished. During the administration of President Monroe the State of Georgia became clamorous and demanded that the Indians should be removed from within her territorial limits in fulfilment of the covenants of the compact of 1802. Other States, both in the South and the West, were impatient to have the native population within their limits removed. Hence, Mr. Monroe in a message to Congress submitted a proposition for the removal of all the Indian tribes from the lands then occupied by them within the several States and organized Territories east of the Mississippi, to the country west of that river. He said in the message that "experience had demonstrated that in their present state it is impossible to incorporate them in such masses, in any form whatever, into our system. It has," said he, "been demonstrated with equal certainty that without a timely anticipation of, and provision against, the dangers to which they are exposed, under causes which it will be difficult if not impossible to control, their degradation and extermination will be inevitable. The great object to be accomplished is the removal of those tribes to the territory designated on conditions which shall be satisfactory to themselves and honorable to the United States. This can be done by conveying to each tribe a good title to an adequate portion of land to which it may consent to remove, and providing for it there a system of internal government which shall protect its property from invasion, and by regular progress of improvement and civilization prevent that degeneracy which has generally marked the transition from one to the other state."

It was when discussing this scheme for the removal of the Indian tribes then dwelling on the east side of the Mississippi River to the west side of the same, that the Secretary of War in 1826 used the language quoted herein, and preceding that quoted from the message of President Monroe. The Secretary in his report, which was exhaustive, suggested many difficulties, and feared that should the removal be made it would not be effective, since he thought "the same propensity which had conducted the white population to the remote regions they (the Indians) now occupy will continue to propel the tide till it is arrested only by the distant shores of the Pacific." Notwithstanding his doubts, such was the pressure for the removal of the Indians to the west of the Mississippi that the Secretary of War submitted a plan and prepared a bill for the consideration of Congress, providing for this measure. The main features of this bill were—that the country west of the Mississippi to which the tribes should be removed was to be set apart for the exclusive abode of the Indians; that they be removed as individuals or families in contradistinction to tribes; and, if circumstances should eventually justify it, the tribal relation should be dissolved, and the Indians amalgamated in one common mass, with a distribution of property among the individuals.

ESTABLISHING A PERMANENT HOME FOR THE INDIANS.

In May, 1830, Congress passed a law authorizing the President to cause the territory west of the Mississippi to which the original title had been extinguished, and which was not included within the limits of any State or organized Territory, to be divided into a suitable number of districts for the reception of such tribes or nations of Indians as might choose to exchange the lands on which they then resided and to remove West. The law authorized the President to solemnly assure the Indian tribes with whom the exchange was made that the United States would *for ever secure and guarantee to them and their heirs or successors the country so exchanged with them.* In pursuance of this law, the Creeks, Cherokees, Choctaws, Chickasaws, Seminoles, Delawares, Shawnees, Miamis, Kickapoos, Pottawattamies, Chippewas of Roche de Bœuf, Sacs and Foxes, Wees, Piankashaws, Kaskaskias, Peorias, and other tribes, were removed. These tribes were each and all guaranteed, and the faith of the nation *solemnly* pledged to them, that the homes to which they were severally removed should be to them and their posterity *their permanent homes for ever;* and many of them had in the most solemn form the pledge of the government that the land granted to them west of the Mississippi should never be embraced within the limits of any organized Territory or State. Except the tracts granted to the Cherokees, Creeks, Choctaws, Chickasaws, and Seminoles, the tribes that were transplanted were located within the present limits of the State of Kansas. Since the organization of that State all these emigrated tribes, except a few hundred Pottawattamies and Kickapoos and some sixty Chippewa and Munsee Indians, have been "bereaved of their lands" and removed from their "permanent homes," and now dwell in the Indian Territory. In relation to the other tribes it may be observed that, notwithstanding the guarantees in the treaties with the Cherokees, Creeks, Chickasaws, etc., etc., by which they were located in this Indian Territory, and by which it was solemnly agreed on the part of the United States that at no future time should their lands be embraced within the territorial limits or jurisdiction of any State or Territory, nor should any State or Territory ever have a right to pass laws for their government, there is now (April, 1880) a bill pending in the Congress of the United States for the organization of the Territory of Oklahoma, and embracing within its defined boundaries the lands of these Indians.

The native Indians west of the Missouri River, residing on the Plains and in the mountain Territories, were essentially wild horsemen, and with them the government had but very slight treaty relations until years after the tribes east of the Mississippi had been transplanted to their *permanent homes* under the provisions of the law of 1830. Since the acquisition of California, and the annexation of Texas and New Mexico, and the rapid immigration to and settlement in the acquired territory by our own population, demands from time to time have been made upon the native Indians for portions of their lands for the use and occupation of the white population, and through the process of treaty arrangements the Indian title has been extinguished to vast bodies of them, within which several new States and a number of Territories have been created and organized. To meet these demands the Indians have been removed from seat to seat, and the process still goes on. Such removals, and so often repeated, have had a most injurious effect on the Indians; and until they cease, and absolute permanent homes are provided for each tribe, it is not seen how this population can with any degree of success become successful cultivators of the soil or proficient in any civilized pursuits.

COST OF INDIAN WARS.

Without going back to the conflicts and wars between the races during the colonial times, it may be stated that the wars of this character that have occurred since the Declaration of Independence, now more than a century, have cost the government from three to four hundred millions of money. These wars have been produced chiefly by the incessant pressure of the white race, and its constant trespass upon the Indian. Even the treaties solemnly made with the tribes by the government have been, with scarcely an exception, broken. The whole record of our Indian wars is one that cannot be examined with any degree of satisfaction or with one single emotion of pleasure, since it is a sickening detail of outrage, robbery, and murder. In these conflicts human life has been fearfully sacrificed. The most friendly and innocent Indians have not been spared, and often in their savage wrath they have slain innocent and unoffending white people.

REMOVAL OF INDIANS.

In the year 1825, when the question of the removal of the Indian tribes to the west of the Mississippi was being discussed, the War Department estimated their number at 129,266. They were distributed as follows: In Maine, 950; Massachusetts, 750; Rhode Island, 420; Connecticut, 400; New York, 5143; Virginia, 47; South Carolina, 450; Ohio, 2350; Michigan, 28,316; Indiana and Illinois, 11,579; Georgia, Alabama, Tennessee, and Mississippi, 53,625; Florida, 5000; Louisiana, 1313; Missouri and Arkansas, 18,917.

The Secretary of War thought there was no necessity to provide for the removal of the Indians in Maine, Massachusetts, Rhode Island, Connecticut, Virginia, and South Carolina; and he expressed the opinion that those in New York, the Ottawas of Ohio, as well as the Indians in Indiana and Illinois and in the Peninsula of Michigan, might all be removed to the country west of Lake Michigan and north of Illinois. He also thought that the Indians in Florida might remain there; and thus he reduced the number to be provided for and to be removed to the country west of the State of Missouri and the Territory of Arkansas to about seventy-nine thousand. In the event of their removal he said that there should be the strongest and most solemn assurance that the country given them should be theirs as a permanent home for themselves and their posterity, without being disturbed by the encroachments of our citizens.

After the passage of the act of May 28, 1830, the process of removal began, and was continued from year to year until the year 1843, when the principal part of the Seminoles were removed. These were the last, and they and some other small tribes who did remove were not contemplated in the report of the Secretary made in 1825 to be removed. The tribes removed were the Choctaws, Creeks, Cherokees, Chickasaws, Seminoles, Shawnees, Wyandots, Senecas, Delawares, Winnebagoes, Pottawattamies, Kickapoos, Quapaws, Miamis, Chippewas of Roche de Bœuf, Sacs and Foxes, Wees, Kaskaskias, Peorias, and Piankashaws—all of whom, by the census or estimate of 1825, aggregated a population of 72,920. The descendants of these Indian tribes, so far as they can be traced, had, in the fall of 1878, according to the report of the Indian Office, a population of 66,861. Of these, 1764 Pottawattamie, Sac and Fox, and Iowa Indians reside in Nebraska; 737 Kickapoo, Pottawattamie, and Chippewa and Munsees reside in Kansas; 2200 Eastern Cherokees reside in North Carolina, Georgia, South Carolina, and Tennessee; 1180 Pottawattamies and Winnebagoes reside in Wisconsin; and about 1000 Miamis and Seminoles reside in Indiana, Texas, and Florida. The residue (59,987) reside in the Indian Territory south of Kansas and west of Arkansas.

It is known that from time to time portions of the Delaware, Shawnee, Seminole, Creek, and other Indians in considerable numbers separated from their respective tribes and went to Mexico. Could the number of these be ascertained, together with the number of individuals and families who have severed the tribal relation and become dwellers among the neighboring white population, it is believed an aggregate could be produced which, when added to the census of 1878 of the emigrated tribes, given in the report of the Indian Bureau (66,861), would produce as large, if not larger, population than the census or estimate of the same tribes made by the Secretary of War in 1825.

According to the report of the Indian Office for the year 1878, the Indian population within the limits of the United States which has treaty relations with the government, and exclusive of the Indians in Alaska, is stated at 250,864. This population is distributed as follows: In Arizona, 20,908; California, 9127; Colorado, 3739; Dakota, 25,616; Idaho, 4911; Indian Territory, 75,479; Iowa, 341; Kansas, 737; Michigan, 9800; Minnesota, 5138; Montana, 19,764; Nebraska, 4064; Nevada, 6977; New Mexico, 22,419; New York, 5093; North Carolina, South Carolina, Georgia, and Tennessee (Eastern Cherokees), 2200; Oregon, 6726; Utah, 820; Washington, 12,969; Wisconsin, 8725; Wyoming, 2188; Indian Texas and Florida, 1000. A few of these Indians are not under the care of any agent, and there are in addition some in several of the New England and other States that have no treaty relations with the United States. The Indians in Alaska are supposed to number about 10,000.

According to the report of the Indian Office for the year 1878, the number of Indians who then wore citizen's dress was 127,450. Of these, 61,467 were males and 65,983 females. The number of houses occupied by Indians was 23,060. Of schools there were among the Indians 60 boarding- and 306 day-schools. The number of scholars attending these schools was 12,222. Of these, 6631 were males and 5591 were females. The number of children of school age was estimated at 49,200. The number of Indians that could read and write was placed at 41,300. There was expended for education during the year $353,125. Of this amount there was appropriated by the Cherokees, Choctaws, Chickasaws, Creeks, and Seminoles the sum of $137,775. The number of church-buildings distributed among the Indian tribes was 219, and the number of missionaries among them was 226. The five last-named tribes, who are called the "civilized tribes" and reside in the Indian Territory, cultivated during the year 245,000 acres of land, the product from which was 494,400 bushels of wheat, 2,642,000 bushels of corn, 210,000 bushels of oats and barley, 320,000 bushels of vegetables, and 116,500 tons of hay. These tribes then owned 40,000 horses, 4700 mules, 236,000 head of cattle, 173,000 head of hogs, and 25,000 sheep.

Other Indian tribes than the five referred to cultivated during the same year 128,018 acres of land, the product from which was 266,100 bushels of wheat, 971,303 bushels of corn, 127,697 bushels of oats and barley, 315,585 bushels of vegetables, 36,943 tons of hay, 193 tons of melons, and 697 tons of pumpkins. There were among and by these Indians 22,319 acres of new land broken during the year, and 128,056 rods of fencing made. There were during the year 2351 allotments of land made to full-blood Indians. These then owned 176,766 head of horses, 4479 head of mules, 52,867 head of cattle, 27,671 hogs, and 510,074 sheep.

Among other products of Indian labor during the year were 8,100,630 feet of lumber sawed, 132,886 cords of wood cut, 200,600 shingles made, 387,000 pounds of maple-sugar made, 164,000 pounds of wild rice gathered, 17,000 woollen blankets and shawls made, 2530 willow baskets made, 3800 cords of hemlock bark peeled, 211,000 pounds of wool clipped for sale, and 3600 barrels of fish sold.

UNCIVILIZED INDIANS.

The Indians of the Plains, as well as those in the mountains, and a large share of those in the Pacific States and in Washington Territory, are still essentially nomads. Such number probably 85,000 to 90,000, who produce scarcely anything by cultivation. They have their herds of horses and cattle, and some of them flocks of sheep, but they do not till the soil. Some of them are so located that, if they desired to engage in agriculture, they could not do so. At the rate that the white settlements are pressing upon them, the time is not distant when they will be compelled, from the contraction of their hunting-grounds and the scarcity of game, to change their mode of life and settle down to cultivation and stock-raising. With all the drawbacks which beset and confront the Indians in every step they take on the road to civilization, the statistics given, with the product from the labor of those engaged in agricultural and pastoral life, should be sufficient to remove all doubts of the capability of the race to become self-supporting, and that in a very few years this result may be reached if these wards of the government have that protection and care to which they are justly entitled.

IS THE INDIAN RACE DYING OUT?

There is a general opinion prevailing that the Indian race is vanishing.

This opinion has been encouraged in the official literature of the country for many years. We read in it from year to year of the "remnants of tribes that were once renowned and powerful, but who have become weak and without spirit or energy." And a cursory reading of the history of our border wars and the number of Indians slain would lead to the conclusion that the race was wellnigh extinct. It is true that from a multiplicity of causes many of the tribes known in our early history have ceased to exist as such, but others that were enabled to pass through the trying period, and who have not been further afflicted with wars or removals, are slowly but surely increasing in numbers. In 1825 the population of the Cherokees was given at 15,000. About 1835 they were—except probably 2000, called the "Eastern Cherokees," who remained behind—removed to the country in the Indian Territory where they now reside. In the removal nearly one-fourth of their number perished. Between 1825 and the period of their removal they suffered loss from wars, and during the late civil war Cherokee troops were engaged in the conflict, and numbers were killed; and yet by the census of the Cherokees taken in 1878 they show a population (including 2200 Eastern Cherokees) of 21,072. The Chickasaws, who were removed at a later period to the Indian Territory, number 2000 more in 1878 than they did in 1825. The Delawares, now located in the Indian Territory, show a slight increase in 1878 over their number in 1854, when they resided in the forks of the Kansas and Missouri Rivers. Several other tribes show a like result.

Considerable attention has in the last few years been given to vital statistics among a number of the Indian tribes, and from the facts given it is apparent that in tribes where a register of births and deaths was kept there is a slight excess of the former over the latter. This ratio of increase is sufficient to justify the conclusion that the Indian race is not vanishing from natural causes. It is an admitted fact that in the wild tribes in the transition state from the life of the nomad to that of the cultivator of the soil there is for a period a decline in numbers. In due time, however, this decline ceases, and a gradual increase follows. The opinion so generally held that, as a necessary result from contact with civilization, the Indian race will disappear, must be modified, and the fact accepted that the aboriginal population is to form a part of the great American race.

There are elements in Indian character of vast importance and essential to the composition of what we proudly claim is to be "the master-race of the world." The Indian is always reverential to the Deity. No tribe has been found that has not a belief in immortality. The Indian is peculiarly a spiritually-minded man. He is straightforward in religion, in politics, in law, in love, in business. He is of all men the most faithful to his engagements. He is of all men the most free and independent. He is the most fearless in council and war. He is the best educated man in self-command and in his respect for the rights of others. Hospitable, generous, confiding, and truthful, he challenges comparison in manhood with those of any race. If he is not all that we have said of him to-day, as he was in his original condition, it is not his fault. The elements of manhood were there when we found him. We may have given him the vices of civilization, and by example taught him to be treacherous and unfaithful in some instances, but no race of crude barbarians has possessed so many desirable characteristics as the North American Indians.

With all these to commend him, it appears strange indeed that the early colonists should have failed to recognize in the Indian the most essential elements of manhood. Wherever we find Indian blood mingling with good white blood we find convincing evidence of the sad mistake our fathers made when they made causeless war upon the Indian. Had they met him upon terms of equality and treated him as a man and a brother, and in Christian spirit taught him by example that they had brought with them a new and better way, a better system of law, a better religious faith and practice, a better domestic and political economy, and demonstrated to him that they were honest when they proclaimed "Peace on earth and goodwill to men," no bloody Indian wars would have scourged the land.

THE CLIFF-DWELLERS.

BY EMMA C. HARDACRE.

OUR ancestors named this the New World. They grouped their cabins upon its shores, believing themselves to be the first who had planted colonies within its primeval forests. After several hundred years' possession we discover that successive and unnumbered civilizations had, possibly, flourished and decayed upon this continent before Columbus crossed the sea. Archæologists have examined fortifications in the prairies, have unearthed cities in the valleys, found sacrificial altars on the bluffs, and burial-mounds by the water-courses, showing that the so-called New World is the mausoleum of a pre-historic race—the cemetery of lost tribes whose crumbling habitations are their only headstones.

Of late, blown over the Plains, come stories of strange, newly-discovered cities of the far South-west—picturesque piles of masonry of an age unknown to tradition. These ruins mark an era among antiquarians. The mysterious Mound-builders fade into comparative insignificance before the grander and more ancient Cliff-dwellers, whose castles lift their towers amid the sands of Arizona and crown the terraced slopes of the Rio Mancos and the Hovenweep.

A ruin, accidentally discovered by A. D. Wilson of the Hayden Survey several years ago, while he was pursuing his labors as chief of the Topographical Corps in Southern Colorado, is described to me by Mr. Wilson as a stone building about the size of the Patent Office. It stood upon the bank of the Animas, in the San Juan country, and contained perhaps five hundred rooms. The roof and portions of the wall had fallen, but the part standing indicated a height of four stories. A number of the rooms were fairly preserved, had small loophole windows, but no outer doors. The building had doubtless been entered originally by means of ladders resting on niches and drawn in after the occupants. The floors were of cedar, each log as large around as a man's head, the spaces filled neatly by smaller poles and twigs, covered by a carpet of cedar-bark. The ends of the timber were bruised and frayed, as if severed by a dull instrument; in the vicinity were stone hatchets, and saws made of sandstone slivers about two feet long, worn to a smooth edge. A few hundred yards from the mammoth building was a second large house in ruins, and between the two strongholds rows of small dwellings, built of cobblestones laid in *adobe*, and arranged along streets after the style of the village of to-day. The smaller houses were in a more advanced state of ruin, on account of the round stones being more readily disintegrated by the elements than the heavy masonry. The streets and houses of this deserted town are overgrown by juniper and piñon—the latter a dwarf, widespreading pine, which bears beneath the scales of its cones delicious and nutritious nuts. From the size of the dead as well as the living trees, and from their position on the heaps of crumbling stone, Mr. Wilson concludes that a great period of time has elapsed since the buildings fell. How many hundred years they stood after desertion before yielding to the inroads of time cannot be certainly known.

The presence of sound wood in the houses does not militate against their antiquity. In the dry, pure air of Southern Colorado wood fairly protected will last for centuries. In Asia cedar-wood has been kept a thousand years, and in Egypt cedar is known to have been in perfect preservation two thousand years after it left the forest. The cedars throughout the territories of the South-west do not rot, even in the groves. They die, and stand erect, solid and sapless. The winds and whirling sands carve the dead trees into forms of fantastic beauty, drill holes through the trunks, and play at hide-and-go-seek in the perforated limbs, until, after ages of resistance, they literally blow away in atoms of fine, clean dust.

On the Rio San Juan, about twenty-five miles distant from the City of the Animas, Mr. Wilson discovered the following evening a similar pile, looming solemnly in the twilight near their camping-place. The scene as described was weird in the extreme. As the moon arose the shadows of the phantom buildings were thrown darkly across the silvery plain. The camp-fires, the tiny tents, the negro cook, the men in buckskin hunting-garb, and the picketed mules, made a strange picture of the summer's night, with background of moonlit desert and crumbling ruins, on whose ramparts towered dead, gaunt cedars, lifting their bleached skeletons like sheeted ghosts within the silent watch-towers of the murky past.

In the summer of 1874 a division of the Hayden Survey, specially detailed for the work under the direction of W. H. Jackson, started to find and investigate thoroughly the ancient cities of the South-west.

They have brought back the first authentic and official information ever received upon the subject. They report the ruins found by Mr. Wilson to be on the northern edge of an immense settlement which once extended its dense population far down into New Mexico. The area covered is several thousand square miles, and embraces the adjoining corners of Colorado, Utah, Arizona, and New Mexico, the most southerly ruins showing much the finer specimens of architecture. The region is remote from civilization, and the nearest railroad point between two and three hundred miles distant. From Fort Garland the way leads across a trackless desert, dotted by sage-brush and stunted grease-wood, and enlivened by rattlesnakes, horned toads, and tarantulas. In patches the alkali rests on the sand in fleecy flakes like new-fallen snow, and over all the sun beats down in tropical fury. The streams formed on the western slope of the Rocky Mountains have cut long cañoned valleys through nearly horizontal beds in the southern part of the desert, and have gashed the underlying rock to a depth sometimes of many thousand feet. The river-beds are for the most part dry, except when in spring the snows come from the mountains in a brief, cool flood, which, disappearing, leaves only pasty, brackish dregs in the pockets of the rocks. Very rarely there are found living springs trickling down the cañon-side, marked by the mosses and leaflets that even in deserts find out and dwell beside the tiniest rill.

Bounded by the Rio Mancos, the La Plata, and the Rio San Juan is a triangle embracing an area of six hundred square miles which does not contain a drop of water. Around the edges of this triangle is a wide-spread network of ravines crusted with ruins. The San Juan and the La Plata have quite a width of bottom-land between their sides, but the Rio Mancos runs like a brooklet along its narrow path, shut in by sheer walls thousands of feet in height. On the terraces of the more open cañons are multitudes of picturesque ruins; in the bottom-lands, the remains of towns; in the wilder cañons, houses perched on the face of the dizzy chasm. In an encampment one thousand feet above the valley of the Rio Mancos are single houses, groups of two and three, and villages, according to the width of the shelf they occupy. They are so high that the naked eye can distinguish them merely as specks. There is no possible access to them from above, on account of the rocks that project overhead—no present way of reaching them from below, although doubling paths and footholes in the rocks show where the way has been of old trodden by human feet.

The cliffs are in some parts limestone, but more frequently sandstone, with alternating strata of shales or clay. The softer layers weather out, leaving caves, whose solid stone ledges serve as floors and roofs of the cliff-dwellings. A few houses are two stories—one showed four stories—but generally they are not higher than a man's head; division-walls are built, beginning at the back of the opening and working outward to the front of the cave, which is so neatly walled by masonry of the prevailing stone that the artificial work is scarcely noticeable by a casual observer. Upon the summits of the loftier battlements are placed at irregular intervals round stone towers, supposed to have been signal-towers. The illustration gives a better idea than words can give of "the ancient watch-tower of the cliffs." The curve of the aboriginal masonry is perfect; the side of the tower has fallen, and the summit is jagged by the gnawing tooth of Time; but it stands boldly on the heights, and waits through the centuries the coming of the dead braves to light again its signal-fires. At present the roving Navajos, excepting scattering Utes, are the only wanderers through the barren land.

In the McElmo Cañon stands a ruin known as "Battle Rock." A huge boulder has fallen, and rests on the wall of a straight fortification, and both boulder and wall are exquisitely wreathed about by wild vines. On the terrace beneath Battle Rock stand the remains of a round building, plainly showing the ends of beams where the floor of the second story has been; on a bench yet lower ruined towers lean heavily against the sandstone bank; while on the very top of the embattled cliff are other walls surrounded by fringes of juniper, and from the pinnacle of the loftiest of the group a slender stem supports a tuft of pine outlined like a black flag against the sky. The country around this spot is strewn with flint arrow-heads lodged in the crevices and buried in the ground. All the arrows lie with their points toward the ruins. In none of the settlements have there been signs discovered of partially-completed points, or anything to indicate that the Cliff-dwellers were a warlike people or that they fought with bows. The arrows are supposed to have been left by an invading horde which swept, in some remote time, over the whole country and waged fierce warfare upon the rich cities of the South-land.

The Battle Rock of the McElmo is not more beautiful than the neighboring "Hovenweep Castle," or, literally, "The Castle of the Deserted Valley." On the surrounding headlands of the Hovenweep, as well as on the distant plateaus of the Dolores and other streams, are sombre "cities of the dead" lifting their monumental tablets from the bare desert-sands. According to our authorities, no bones have been found in these cemeteries, no signs of graves, but charred wood and ash-heaps are mingled with the sand. In all probability this ancient people were fire-

AN ATTACK ON A VILLAGE OF CAVE-DWELLERS.

worshippers who cremated their dead, and fancied that the souls of their race fled as the sparks upward, and found their heaven in the bosom of the blazing sun. The stones are mere memorials showing the spot where the dead were burned. The fact that the sun was their deity is substantiated by the *estufas* in their dwellings and in their cities. The buildings where their sacred rites were performed are of circular shape, depressed in the centre of the floor, show marks of altar-fires, are often triple-walled, with partitions extending from the centre through the walls, like the sun's rays, dividing the space into small apartments where their treasures were stored. The present Pueblo Indians of New Mexico and Arizona are believed to be the remnant of the descendants of the conquered Cliff-men. The mud houses of the Pueblos are modelled rudely after the stone dwellings of the bottom-lands, and some signs of retrograde civilization link them to a better time. The seven Moqui cities of Arizona have estufas and the tribes are fire-worshippers. The Moqui towns are now in precisely the state of preservation that they were described by the invading Spaniards to be nearly four hundred years ago. Assuming the Moquis to be lineal descendants of the Cliff-dwellers, how vast a time the old cañon castles must have been deserted when even the Moquis have no knowledge of the grand homes of their ancestors! Regarding the age of the Pueblos, they were said by Coronado, at the time of the Conquest, to look very old. Casteñado records that the inhabitants told him that the Pueblos were older than the memory of seven generations.

The ruins now made known to the public, at the time of the Spanish invasion were spoken of as fabulous, and in 1681, in the journal of Don Antonio de Otermin, mention is made of vague rumors to the effect that eighty leagues distant there were *Casas Grandas* which had long before served as fortresses. Albert Gallatin said: "There are said to be in these parts ruins of ancient buildings known as *Casas Grandas*, ascribed to the Azteques."

That the Pueblo Moquis are fire-worshippers, as were the cliff-dwellers, is made evident by an account in Davis's *Conquest of New Mexico:* "Many curious tales are told of the superstitions of the Pueblos. It is said that Montezuma kindled sacred fires in the estufas, and commanded that they be kept burning until his return. He was expected to appear with the rising sun, and every morning the inhabitants ascended to the house-tops and strained their eyes looking to the east for the appearance of their deliverer and king. The task of watching the sacred fires was assigned to the warriors, who served by turns a period of two days and two nights without eating or drinking, and some say that they remained upon duty until death or exhaustion relieved them."

Espejo says: "In the Pueblos they represented, by means of pictures, the sun, moon, and stars as objects of worship. When they saw the Spaniards' horses they were on the point of worshipping them as superior beings; they subsisted them in their most beautiful homes and entreated them to accept the best they had."

Davise says: "The houses are mud and stone, entered by means of outside ladders. I was shown their god Montezuma. It was made of tanned skin stretched on a circular frame nine inches in diameter; one half was painted green, and the other red; on the green part were holes representing eyes—on the red part, pieces of leather for ears and mouth. The people knelt around it and offered prayer. One of them told me this senseless thing was God and the brother of God."

One of the Hayden party who visited these Pueblos in 1875 says that at sunrise the inhabitants stand on the house-tops and stretch out their arms toward the east, waiting silently for the sun to rise above the horizon. When it appears they burst into a great shout and disappear within their homes. It cannot fail to be an interesting study to trace out the line of kinship between the Indians of the old Pueblos and the earlier residents of the stone buildings in the cañons. The investigations now inaugurated must before long lead to clearer ideas concerning the lost tribes.

To return to the cliffs. Portions of the cañon-walls were painted with pictorial word-writing and curious hieroglyphics. In one case inscriptions were seen back of a boulder through the crevice, between it and the wall. The boulder had fallen from above so many years ago that parts of it were imbedded in roots and trunks of trees, yet the writing back of it was as fresh as though painted yesterday. The pottery found in all the ruins is similar in form and texture; it is thin, of hard finish, and painted in colors that have lost none of their original brightness.

In a shallow cave of the Rio de Chelley, a few hundred feet above the river-bed, fifty exquisitely tinted arrow-heads and seven large jars were unearthed. The cave contains a house three stories high, having seventy-six rooms on the ground floor. The ruins are five hundred and fifty feet long. Within the work-room were large grindstones and various implements of the Stone Age. The walls are plastered in white cement of stucco-like finish. That it was spread on the walls by human hands is evident from the marks of the pores of the skin to be found on the surface. Occasionally, the whole print of the hand has been left; one woman's slender fingers are thus preserved for the people of the nineteenth century; they seem to be extended, as though pleading to be rescued from the horror of annihilation. Low down on the walls are the chubby palms of little children, with every crease and dimple preserved.

A very picturesque ruin of the Rio de Chelley has been ingeniously modelled in miniature, together with the face of the bluff in which it rests. The worn steps up the rock, the cave, and crumbling masonry are more perfectly reproduced by the sculptor's chisel than is possible by pen and pencil. Duplicates of the design have been made in plaster, painted in the warm buff tints of the shaly sandstone. These are framed, and will be sold at their first cost by Professor Hayden to colleges or private individuals, and will be invaluable in explaining the cliff-ruins to students interested in all that pertains to the former inhabitants of North America. The models are about three feet by two in size.

Among the countless ruins of the Rio San Juan there is a circular cave two hundred feet high, opening like a deep round tunnel in the cañon-wall. Across the centre of the cave a shelf of hard rock forms the foundation of a stately pile, which extends into the twilight of the cavern, midway up the height. It can be seen for the distance of a mile down the bend of the cañon. In the interior an open space probably served as a workshop. Holes in the rock formerly supported the posts of their looms, while grooves in the floor mark where the workmen made their stone saws and sharpened their clumsy stone axes. The front part of the lower floor is in one long apartment or promenade; the upper rooms have small windows, communicating doors between the apartments, and outer apertures leading into the back part of the cave. The mild climate excused the necessity of any house-covering other than the dome-like ceiling of the vaulted cavern. In a central room of the main building a depression, bearing traces of aboriginal fires, marks what was once the kitchen-range of the manor: on smooth hot stones their cakes of acorn paste were baked; the stones yet lie beside the ash-heap. In the pit they roasted their sheep; the bones remain in a refuse-heap outside. Whether plain corn on the cob or succotash was most relished by these spectres we shall never know, although an impression of a cob in the plaster on the wall proves that corn was raised in the time of the Cliff-dwellers. Several of the apartments have marks of fires built against the back walls, where the smoke escaped overhead through the open roof. The house is bare, except much broken pottery, artistically painted; things of value have long since been carried away by the roving bands of Indians. The mansion presents an unusually imposing appearance. None of the neighbors boasted so big a cave or so grand an entrance-hall. The family which in the old time dwelt therein must have been of the aristocracy of the land.

From the promenade upon the house-top they could look down the steep descent to their waving fields of corn and groves of cotton-wood, their sheep-corrals and piñon-orchards, and upward to the grand roof of the cavern which Mother Nature had scooped with her giant hand for their sheltered homestead. To this cave-house Mr. Jackson gave the name "Casa del Eco," because of the resonant reverberations which caused the faintest whisper of the visitors to be repeated as though by hosts of phantom lips within the shades of the gray old ruin.

In the time when Casa del Eco resounded with merry life, social distinctions, I suppose, existed as now. In pre-historic times, no more than in our times, could every one afford a palace. Poverty hid her wan face behind picturesque simplicity, and young people tried love in a cottage and dwelt in dove-cotes beside their prouder kinsfolk. A tiny home, neat and trim as a Yankee kitchen, is perched on the heights of the West Montezuma, near its junction with the East Fork. The house is built in an oval hole which has been weathered out of a solid block of sandstone that rests on the brink of a curiously-stratified chasm. The dwelling, six by ten feet, is as securely tucked away from the sun and rain as a small boy under an umbrella. The space between the side of the house and the enclosing rock forms a nice little shady piazza. Who knows but from this eyrie some dusky bride watched for her lover when the evening shades settled dark in the cañon lane?

Farther down the Montezuma are settlements at the base of the bluffs containing houses one hundred feet square, with foundation-walls extending six feet below the surface of the ground. In one was found a stone axe ground to an acute angle and shaped ready to tie on to a handle; small rope made of twisted rushes, a small unbroken bowl, and ears of charred corn were taken out of the ruins. A row of small houses, hanging over the brink of a narrow ledge high in air, threatens a barrack-like row three hundred feet below. The lower terrace has been dug out to a depth of six feet. The space is occupied by a row of tenement-like houses four hundred feet in length. The corner room affords access to the row; communicating doors lead through the interior.

Mr. Jackson, in his late report, says: "The cañon sometimes expands into valleys from four to eight hundred feet wide, then contracts to a passage of twenty feet. In the wider places the rocks jut out in tongue-like projections, occasionally connected with the main land by a narrow comb of rock, and sometimes cut away entirely by the erosive powers that chiselled the cañons. Within a distance of eighteen miles fifteen of the promontories bear ruins upon their isolated heights. In one the skeleton of a man was found, wrapped in shreds of a white and black Navajo blanket. The form was that of an Indian, who without doubt had wandered in there, and died alone in the cave-shelter."

Of the multitudes who swarmed through the cañons and the plains when the wonderful stone-cutting and tree-hewing were going on, when the towns were being built, and the country homes perched on the high places, there have been no bodily remains found which could be identified as those of the Cliff-dwellers. A single skull, petrified, with the brain-pan filled by solidified sand, was discovered in a ravine eighteen feet beneath the surface; above it were the ruins of two ancient houses, one built over the foundations of the other: a few feet of drift separated them, indicating that considerable time had intervened between the periods of their erection.

The most remarkable ruins yet discovered are those standing in New Mexico some little distance from the ones already mentioned. They put to shame the primitive log hut of our forefathers, the frame shanty of the prairie town, the dug-out of the mining-regions, the adobe shelter of the Pacific slope. In size and grandeur of conception they equal any of the present buildings of the United States, if we except the Capitol at Washington, and may without discredit be compared to the Pantheon and the Colosseum of the Old World. Thirty years ago, while on a raid against the Navajos, Lieutenant Simpson, of the staff of Colonel Washington, military governor of New Mexico, found some of the ruins of Chaco Cañon, the most southern of the ancient cities of the South-west. Mr. Jackson was fortunate in finding at Jemez an Indian who had accompanied Lieutenant Simpson in his visit. Hosta is past eighty, of thin and stooping frame, but he assured the Hayden party that he was as young as he ever had been, and could pilot them through the nearest cut to Chaco Cañon. He enlivened the journey by garrulous reminiscences of his former trip, and described Colonel Washington and his men as he remembered them. After crossing the New Mexico line, the explorers report that singular optical illusions were frequent. The cheating mirage hovered before them, holding up green oases and shadowy walls, vine-draped and tree-embowered; the sand-hills, sage-brush, and scant grass were magnified into mountains, forests, and fields of maize.

The ruins are visible seven miles away as one looks down from the continental Divide, from which the cañons begin their way in furrow-like gulches. Near by are low mesas and buttes, and the Jemely Mountains, the San Mateo, and the Cerro Cabezon are in clear view. The ruins of the cañon are eleven in number, strung along at distances of from a quarter of a mile to two miles from each other. In the rocks of Pueblo Pintado, Mr. Jackson discovered elaborate stone steps, where the rock had been carved into ladder-like rounds which the hands could grasp.

The Pueblo Penasco Blanca on the opposite side of the cañon is in form of an ellipse. The western half of the ellipse is occupied by a massive structure five rooms deep, and the other half by a single continuous row of small houses, serving as a wall to enclose the court. The interior of the court is 346 by 269 feet; by adding the depth of the surrounding buildings, an exterior is obtained of 499 feet by 363 feet, whose circuit is 1200 feet. The great depth of the *débris* indicates an original height of five stories. There are seven estufas on the west side.

The Pueblo del Arroya has wings about 135 feet in length, and the western wall of the court is 268 feet. Facing the centre of the court are three circular estufas, one of thirty-seven feet in diameter and three stories in height. Mr. Jackson made a remarkable discovery in this pueblo. He says: "About two hundred yards up the arroya are ruins whose upper surface is mound-like, showing very faint traces of masonry. The stream has undermined one corner, exposing a wall at a distance of five or six feet below the level of the valley. No surface indications of the exposed wall are found. The arroya is here sixteen feet deep, but there is an older channel cutting in near the large ruin only half this depth. Below the remains of these walls, and extending out into the main arroya to the depth of fourteen feet below the surface, is an undulating stratum of broken pottery, flint chippings, and small bones firmly imbedded in a coarse gravelly deposit."

The Pueblo Weji-gi is built of small tabular pieces of sandstone, arranged with a beautiful effect of regularity and finish. It is a rectangular structure, built around an open court. Its exterior dimensions are 224 by 120 feet; its height, three stories.

Near the Pueblo Una Vida the cañon has a width of five hundred feet, perfectly level. Within the court of this pueblo are the remains of the largest estufa yet found in any of the ruins. It measures over sixty feet on the inside from wall to wall; its upper plane is on a level with the floor of the court; it was evidently subterranean.

Nearly all the logs which supported the flooring are yet in position in the Pueblo Hungo Pavie. The height is four stories; the lower walls three feet thick; the estufa extends to the second story, and has a projection or porch built upon one side; the interior is twenty-three feet in diameter, and has six pillars of masonry built into the wall at equal distances.

The Pueblo Chettro Kettle is 440 feet long and 250 feet wide, and presents remnants of four stories. The logs forming the second floor extend through the walls a distance of six feet, and probably at one time supported a balcony on the shady side of the house. The sand has drifted far above the first floor, and completely blocked the windows. A coyote's hole exposed a wall beneath the surface that had been completely covered by drift. The masonry of this pueblo is unusually handsome—built of very small pieces of a rich buff sandstone, arranged so compactly as to give the idea of a homogeneous surface. Mr. Jackson estimates that in the wall running around three sides of the building, 935 feet in length and 40 feet in height, there would be two million pieces of stone for the outer surface of the outer wall alone. This surface, multiplied by the opposite surface, and also by the interior and transverse lines of masonry, would form a total of thirty million pieces embraced in three hundred and fifteen thousand cubic feet of wall. The millions of pieces had to be quarried and put into position; timbers brought from a distance; ladders constructed and plaster prepared, employing a large number of skilled workmen under good discipline a long time. When we consider not alone the immensity of these ruins now on the surface, but reason concerning the massive foundations of other older buildings under these, exposed by the chance burrowing of wild beasts or the slicing down of banks by washes and arroyas, the mind, bounded by our little span of threescore years and ten, cannot fathom the obscurity of the deep-sunk ages of the past filled by the works of so great an antiquity.

Not more than six hundred yards from the Pueblo Chettro Kettle is a handsome ruin which bears the musical title Pueblo Bonita. It is built within twenty yards of the bluff, on the level bottom-land, which extends in a sandy plain for some distance, watered by a shallow brooklet. The length of the Pueblo Bonita is 544 feet, its width 314 feet. It has been restored by Mr. Jackson, of the Survey, to what he deems its original form, and is presented in a sketch in the government report. A study of the picture of the pueblo as it was before its changes came will be of more interest than a description of it in its ruined condition. In our second hundredth year of national existence we are confronted by tokens of a once-powerful nation which held our land before us. It is natural that we feel an interest in the unknown race, and search every crevice of the past for mementoes of the lost. Dr. Hayden and his corps of assist-ants have surveyed a rich field of antiquarian treasure. After their centuries of silent musings upon the river-banks the old castles hear again the sound of human voices. The new lips speak a strange language. The pre-Columbian race, through whose dismantled homes the strangers wander, have passed into the shades of impenetrable oblivion, leaving only Conjecture to tell, with uncertain tongue, her story of the Cliff-dwellers.*

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* The writer is indebted to Professor F. V. Hayden for special courtesies, to A. D. Wilson for verbal description, to W. H. Jackson and W. H. Holmes for sketches and valuable information. The editor desires to add his opinion that the present paper does not give Mr. Ernest Ingersoll deserved credit for discoveries among these ruins.

YOSEMITE AND THE BIG TREES.

BY REV. GEORGE A. PELTZ, D. D.

CALIFORNIA is essentially a land of wonders. Its physical features, its variety of climate, its diversified scenery, its mineral and vegetable products, its animal life, its cosmopolitan population, and its engineering exploits, are all wonderful. Nowhere can the intelligent tourist find more to amuse and instruct than is found ready at hand everywhere in the Golden State, but, by common consent, the Yosemite Valley and the Big Trees are placed foremost among the wonders of this wonder-producing section.

There is a geographical reason for placing these two objects together, aside from the fact that in their respective spheres each of them is supreme. Among valleys Yosemite is the queen; among trees California's giants are the sovereigns. But Nature has placed these wonders in the same general stretch of her domains. He who goes to Yosemite must go near some of the Big Tree groves, and he who goes to a Big Tree grove should keep on a little farther to the famous valley.

THEIR LOCATION.

All the groves of Big Trees lie along the western slope of the Sierra Nevadas. They extend along a stretch of some two hundred miles, but immense gaps are scattered between the several groups or groves. They are never found at an elevation of less than four thousand feet above the sea, and their highest altitudes are about a thousand feet more. Thus, these groves flank the Sierras on their westward slopes, and look out over the intervening mountains, rivers, plains, and cities to the great Pacific Ocean. Back of this great-tree line, some twenty-five miles, separated, however, by towering ridges, lies the peerless valley, its almost flat bottom at a height above the sea about equal to the lower line of the big-tree belt—

in round numbers four thousand feet. Be it remembered that the general direction of the valley is north-east and south-west, and that all access to it is from the north-eastern end, by which the Merced River leaves it. On all other sides the valley is surrounded by precipices and rocky piles which defy passage, and beyond these the peaks and highlands of the Sierras, often buried in snow for the entire year, stretch away in impassable grandeur. And now, with this valley as the objective point, how shall one from the busy world outside find his way into it?

APPROACHES TO THE VALLEY.

Whatever be the tourist's location (except indeed it be Southern California, Arizona, or Mexico), he will approach his destination by means of the Central Pacific Railroad, and even from the district just excepted he will approach by one of its branches, the Visalia and Los Angeles Railroad. The several routes into the valley, with their respective distances from San Francisco, are thus given by a California authority:

I. Big Oak Flat and Calaveras Route.

1. Direct Route.

To Stockton and Milton (rail)	119 miles.
Milton to Yosemite (stage)	88 "
Total	207 miles.

2. Via Calaveras Big Trees.

By rail, as above	119 miles.
By stage	148 "
Total	267 miles.

II. Coulterville Route.

By rail to Merced	140 miles.
By stage to Yosemite	88 "
Total	228 miles.

III. Mariposa Route.

By rail to Merced	140 miles.
By stage to Yosemite	97 "
Total	237 miles.

IV. Madera Route.

By rail to Madera	173 miles.
By stage to Yosemite	92 "
Total	265 miles.

Greatest Elevation before Reaching the Valley.

Big Oak Flat Route (near Tamarack Flat)	7040 feet.
Coulterville (near Hazel Green)	5650 "
Mariposa Route (Chowchilla Mountains)	5750 "
Madera Route " "	4750 "

Steepest Grades.

Big Oak Flat Route	20 feet in a hundred.
Coulterville	15 " " "
Mariposa	17.5" " "
Madera	10 " " "

Everything pertaining to travel in California varies widely as told by differently interested parties, but the foregoing statement is substantially correct. By either route the round-trip ticket from San Francisco is fifty dollars, with a small addition if Calaveras Grove is visited. The better way is to enter by one route and leave by another. This can be done by pre-arrangement, by exchange in the valley, or by paying to enter merely, and then to come out as may suit. In either case the cost is not materially different.

To classify the above table somewhat more perfectly, observe that by Route I. passengers leave the Central Pacific Railroad at Stockton, which is ninety-two miles east of San Francisco. There they take the Stockton and Copperopolis Railroad for Milton, some forty miles, where they take stage, either by Calaveras Big Trees or direct to the valley, as they may elect. In both cases the valley-end of the route by Chinese Camp, Priest's, Big Oak Flat, Tuolumne Grove of big trees, and Tamarack Flat is one and the same. All passengers by this route see the few big trees at Tuolumne, and the stage-road is cut direct through the body of "The Dead Giant," a standing trunk some thirty feet in diameter and perhaps a hundred feet high. Route I. in both its branches is known as the "Northern Route."

For either of the other routes passengers leave the Central Pacific at Lathrop, eighty-two miles from San Francisco, where they take the Visalia Division, which leads to Los Angeles, Arizona, and where not? Of course persons on the southern portion of this road will come northward to the starting-points they desire to reach. Fifty-eight miles south of Lathrop is Merced, from which point two lines of stages start for the Yosemite, constituting Routes II. and III. as given above. By the Coulterville route one passes through the Merced Grove of big trees, and enters the valley finally by a road which follows the channel of the Merced River. By the Mariposa route one passes near the Mariposa Grove, and makes his stop for the night at "Clark's," otherwise "Big Tree Station."

When upon the Visalia Branch road the tourist may run on to Madera, ninety-one miles south of Lathrop, whence stages start by Route IV., and, having passed near the Fresno and the Mariposa Groves of big trees, they, with those of Route III., spend the night at "Clark's." From "Clark's" into the valley is a splendid ride over mountain-roads. In a few hours the valley is reached, and the first view of it is had from Inspiration Point. No such comprehensive survey of this magnificent scene is had by the other routes. The northern lines from Big Oak Flat descend into the valley on the opposite side of the river, which is so embosomed in the mountains that no broad outlooks are secured; and the Coulterville lines enter at the level of the valley-bottom, and therefore have no overlook. By one of these three entrances all passengers enter the valley, and by them all easy access is had by first-class stages.

THE BIG TREES.

After this general survey of the approaches to the wonderful region under consideration, a detailed survey of the Big Trees is in order. They are not ordinary trees, grown big by force of favoring circumstances. Such, indeed, are the favoring conditions of growth in many parts of California that all vegetable life becomes gigantic. Vines, fruits, vegetables, flowers, and trees of all kinds surpass their less-favored kinsmen of other climes. "Big Oak Flat," mentioned above, took its name from an immense oak tree which the gold-diggers finally undermined, but which still lies at the roadside, dead indeed, but colossal. At the dinner-station at Fresno Flats stands an oak twenty-one feet in girth. Near "Clark's" is a sugar-pine about which six tall men stood closely, and around which their extended arms barely reached. Trees naturally run to bigness in that climate, but the genuine Big Trees are of a big family.

Popular parlance on the Pacific Coast calls them "redwoods," but scientific parlance designates them as *Sequoias*. Of the *Sequoia* family there are two branches—first, the *Sequoia sempervirens*, which is used on the Pacific Coast much as the white pine is with builders in the East. This tree, however, never becomes gigantic, though, compared with ordinary pines, it might be so called. The other member of this family is designated *Sequoia gigantea*, and of this race the giants come.

On the authority of Mr. John Muir, the eminent naturalist of the Pacific Coast, the clusters of Big Trees may be thus designated: (1.) *The Calaveras Group*, which is the most northerly of all. This is reached by Route I., as described above. It contains about one hundred of the giant trees. The grove is private property, and is kept in superb order. A first-class hotel is located in the very heart of the forest, and opportunities for gathering facts, specimens, etc. are abundant. (2.) *The South Calaveras Group*. This lies about five miles south of the former, and is reached by horse-trail. Here are over three hundred of the giants, in all ages, stages, and conditions. (3.) *The Tuolumne Group,* which is some forty miles from the last. It has but a few trees, and is on the Big Oak Flat route. (4.) *The Merced Group,* which is six or eight miles from the last. It is on the direct route *viâ* Coulterville. (5.) *The Mariposa Group,* which is fifteen miles from the last, and about a mile off the line of the Merced and the Mariposa routes. This is a splendid grove, containing over three hundred gigantic trees. It is the property of the State, having been deeded, with all the Yosemite region, by the United States to California. It is in charge of a board of guardians, and is to be held for ever as a public park. (6.) *The Fresno Group,* which is some thirty miles from the last, and is situated near the Madera route, being accessible from the dinner-station of the stage-line. (7.) *The Dinkey Group,* which lies some fifty miles beyond the last. (8.) *The King's River Group,* which begins fifteen miles farther south, and is a great unbroken forest of *Sequoias,* which stretches away for many miles, and forms what Professor Muir calls "the grandest display of vegetable life which is known upon the globe."

Examination of the localities occupied by these giants of vegetation indicates that they pre-empted the soils first left bare on the disappearance of the Glacial Period. How long ago this was is entirely conjectural, but the most venerable of the trees now remaining are probably three thousand years old, and the average age of those still living is supposed to be fifteen hundred years. These trees are always found in wet places, the immense rootage favoring marsh formation, and the immense amount of nourishment required demanding it. Fossil *Sequoias* have been found in the northern zone, especially in the neighborhood of Disco. These are found in the Tertiary and Cretaceous formations, showing that this lordly tree flourished in those high latitudes before the great Glacial Period. The climate must then have been much warmer than now, as nothing greater than the dwarf birch now grows there.

A few simple illustrations of the size of these trees will enable any one to estimate their immensity. In South Calaveras Grove is a tree, standing and alive, into a cavity in which the horseback-parties which visit it drive. Fifteen or sixteen mounted men are easily packed into it, and the guides affirm that twenty, and even twenty-one horses, with men on their backs, have been stowed away there. In the Tuolumne Grove there is a tree through which the stages are driven, as is mentioned above. When the writer of this sketch passed that way he rode in a four-horse stage, which carried eleven passengers, with the driver. The stage stopped in the way cut through the tree. On either side of the halted stage there was room for the passengers to alight, which all did. Passing to the side from which the stage had entered, and aligning across the opening, the rear of the stage, including the baggage-boot, was entirely hidden from view in the body of the tree. Passing to the front and aligning across there, the wheel-horses were entirely covered. Any one who is so fortunate as to see a stage such as is here described can form his own estimate as to the size of the grand old trunk through the base of which this wagon-way is cut.

In the Calaveras Grove there are several splendid illustrations of size. The "Pioneer's Cabin" is a living tree with a split in its front. This is so wide that six gentlemen, seated on easy-chairs across the opening, were photographed there, and between every two chairs was room enough for an additional chair. The opening is about seventeen feet in the clear, the entire width of the tree being about thirty feet. The "Father of the Forest" is a fallen and much-decayed giant in this same grove. About eighty feet from the root the trunk broke in falling. At this point mounted men enter the hollow trunk, through which they ride for about one hundred feet. At the point where they emerge the writer of this sketch entered afoot, and walked upward in the trunk for about twenty feet. Here he found a short ladder against the side, up which he clambered, and, though he weighs two hundred pounds, out he went at an old knothole, not so much as soiling his coat or tipping his hat; and, having stood a moment on the rim of the hole, he leaped to the ground on the outside, persuaded fully that to creep out at a knothole was, after all, no very mean affair.

The crowning illustration of immensity is found in one, the only one, of the great trees which man has ever felled. This grew in the Calaveras Grove. It was determined to cut it down, for scientific uses in the main. Five men worked upon it twenty-two days, not chopping or sawing, but boring it with pump-augers. After the separation was complete the base was so great and the centre of gravity was so well sustained that the veteran refused to fall. Ropes, pulleys, and wedges were finally brought to bear, and down the giant came. The tree was over three hundred feet long, ninety-six feet in circumference at its base, and sound to the heart. Sections were cut from the main trunk for museums and curiosity-hunters. The upper, uncut portion was levelled off for a bowling-alley, but, not having been covered, has gone greatly to decay. The section of the trunk next the stump was set apart as an observatory, ascent to its summit being made by a flight of steep steps. The top of the stump itself was some six feet above the ground. This was smoothed off, levelled, and its irregularities filled out to make a true circle, which was then covered with a pavilion structure, and on the following Fourth of July four full sets, of eight persons each, danced upon it, with plenty of room for spectators around the edges and for the orchestra which furnished the music.

Of the capacities of this one stump Bishop Kingsley presented two other illustrations. He calculated that you might here find room for a minister with his desk, a chorister with his organ, and a congregation of one hundred persons. Or with the square feet upon the top of this stump you might construct a parlor twelve feet by sixteen, a dining-room ten feet by fifteen, a kitchen ten by twelve, two bedrooms each ten feet square, a pantry four feet by eight, two clothes-presses each four feet wide by one and a half feet deep, and even then have a little to spare. These narratives may seem to be "very large stories," as a critical editor once said of them, but let two things be remembered in connection with this seeming exaggeration: (1) as this very editor confessed, "they are about very big trees;" and (2) they are but a few specimens from many as unusual, or even more so.

YOSEMITE.

Having spent so much time among the Big Trees, we anxiously turn toward the great valley. By which route shall the valley be entered? Unquestionably, by Inspiration Point, which means that we approach from "Clark's," otherwise "Big Tree Station," which is the night-halt of the Madera and the Merced stages. While at this place let the Mariposa Grove be visited. They will tell you there that you had better visit the trees as you return, and for this various reasons will be assigned. The only real reason is, however, that they desire to commit you to return by their way. This they do not state, but this is the fact. See the Mariposa trees as you enter, therefore, then journey on untrammelled toward Inspiration Point.

INSPIRATION POINT.

The Inspiration Point around which the stage-road bends, and at which the stage makes a halt, is not the Inspiration Point of the earlier days. That is some fifteen hundred feet higher up, on the very summit of the bluff, and is reached only by horse-trail. But the point reached by the stages is not to be despised. It is two thousand feet above the bottom of the valley, and situated at its very foot, so as to command a complete view of all the immediate surroundings. The higher Point gives an outlook over the pinnacles and summits of the Sierra Nevadas, which the lower Point does not; but for the valley proper and its peculiar charms the lower view is by many deemed preferable. The point at which Moran did the work on his great painting of the valley was by no means the highest he could find, but it was unquestionably the best. So it is with the lower Inspiration Point as a standpoint for the valley views.

As the stages draw near the valley the excitement for the first peep runs high, and the non-communicativeness of the drivers is a serious aggravation. You think you see it, but are told you do not. However, you do see multitudes of magnificent views, some of them including snatches of the valley scenery; but at last, whirling out of a well-wooded road and coming to a sudden halt on the very edge of a terrific precipice, the driver shouts, "Inspiration Point!" and before you realize it you are in the presence of magnificence ineffable. The first impression is that of enchantment. There is such a blending of depths and heights, of hard granite and soft foliage, of swaying waterfalls and eternal rocks, of snow-capped peaks and summer-decked vales! There are domes and half-domes, peaks and pinnacles, spires and columns and arches. The possibilities of rock-sculpturing seem to have been exhausted—here and there untouched masses to have been flung down in despair. There at the green bottom of the valley creeps the Merced River, but, as you see it, it is but a silver thread. Yonder is Yosemite Fall, like a line of whiteness down the mountain-side. Above it floats a fleecy cloud which seems to pour itself in snowy pureness down the cliff. And here is the Bridal Veil Fall! See it float and sway and trail as in its misty leap of a thousand feet it is tossed by the passing breezes, like the veil of a human bride amid the breezes of a spring day. And here is El Capitan, "the Captain" indeed—bald, solid, stupendous, so unlike anything else about him; a veritable commander, with a magnificent but obsequious following. "All hail, El Capitan!" rises instinctively to the lips as the hand unbidden tips the hat in deserved salute. And over all these charms, and many more, hangs the beautiful, soft, transparent atmosphere of California's spring-time. You think you see a wonderful fancy sketch, and no real scene. You think you dream. You think you are under a spell of enchantment. You are ready to soar. In thought, in feeling, in soul, you do soar, until "All aboard!" is gruffly shouted by the driver, who casts off the brake, cracks his whip, and the clatter of iron shoes and the rattle of stage-wheels bring you back to the realities of life. Down, down, down we rumble to the bottom of the valley.

VERNAL FALLS, YOSEMITE.

BY THOMAS MORAN.

IN THE VALLEY.

Now that we are fairly in the valley, we may well look about and get some of its details clearly before us. The valley-bottom is about six miles long and from a half to three-quarters of a mile wide. The average height of the enclosing cliffs is more than the average width of the valley-bottom, so that the general resemblance is that of a trough deeper than wide. At the foot of the valley by which we entered the Merced River flows out by a rocky channel cut through towering mountains. At the head of the valley there are three branches or cañons, which formerly were the beds of as many glaciers, as now they are of flowing streams. The walls of the valley proper are also broken more or less, and slashed with intersecting cañons. The accumulation of débris around the valley is surprisingly small, though the position of many immense fragments shows that since the valley assumed substantially its present form there has been terrific earthquake agitation here. The entire length of the valley-bottom is beautifully wooded, many lordly pines rearing their heads as best they can among their overtowering surroundings.

The Merced River is a clear, cool, deep stream. It abounds in trout, which are caught in large numbers by the Indians dwelling in the valley, and are supplied generously at the hotel-tables. The act governing these grounds forbids the leasing or sale of grounds to parties other than those connected in some way with the maintenance of the public park which, as mentioned above, this valley and the Mariposa Big Tree tract now form. A few of the Digger Indians dwell permanently in the valley, but they are a poor, low, shiftless party. A few white persons also usually winter here, and the summer resident population is possibly about two hundred. These are hotel-keepers and attendants, saddle-horse and stage proprietors, drivers, guides, storekeepers, barbers, photographers, etc.

HOTELS.

The three hotels of the valley are grouped about the vicinity of Yosemite Fall, at the upper end of the valley proper. From the first to the last is about a mile by the wagon-road, and the Chapel, the President Guardian's dwelling, the Hall of the Guardians (official overseers of the park), photograph-galleries, curiosity and other stores, stables, cottages, and other paraphernalia of the village, are all grouped about this intervening mile.

This first hotel as you enter the valley is known by the name of the proprietor, Liedig, who is a German. He furnishes good and well-served meals, but is a little crowded in bedrooms. His patrons uniformly speak well of him. Liedig and his family spend their winters in the valley, and he says he wishes to be buried close up under the Sentinel Rock, which is at the rear of his house. The second hotel is "Black's." Mr. Black is a Scotchman who has spent many years in California, and who owns considerable land in the vicinity of Yosemite. He gives his guests good rooms, and good food too. Everything about the place is well kept and in perfect order. From the front porch of his house a full view of the Yosemite Fall is had, from the lip where it pours over to the point where it disappears behind the intervening treetops. "Barnard's" is the last of the three hotels. It was formerly known as "Hutchings'," after the author of the first guidebook to the valley, who formerly kept this house. This, too, is a very satisfactory hotel, and possibly has a situation a trifle more favorable for immediate outlooks. The post-office and telegraph-station of the valley are located here. Prices at these three hotels are about the same, three and a half and four dollars per day being the usual charges. The doubts of some as to their feeding capacity were dispelled in June, 1879, when the Pacific Sunday-school Institute Excursion party went into the valley some two hundred strong, but all were fed well, though some *did* sleep on the floor.

DRIVES AND RIDES.

Opportunities for driving are not numerous here. You can make the round trip of the valley and see the base of El Capitan and the foot of the several falls. This trip none should omit. From a point near the foot of Yosemite Fall the line of water, from where it breaks on the rocks before you to where it curves over the rock-lip 2640 feet above you, is clearly seen. The intervening cascades of the middle section are lost to view indeed, but the lower and the upper falls seem to blend in one, and you have the entire altitude in your view. From the Glacier Point Trail, on the opposite side of the valley, both falls and the central cascades are had in one view. The trip to the foot of Bridal Veil Fall should be made in the afternoon about four o'clock, so as to catch the finest effects of the sun. At this time you can approach to the very foot of the fall, and as the spray floats here and there in the breezes and the fall sways to and fro, rainbows of supreme magnificence will come and go, will glow and fade, will approach and recede, will multiply and disappear, until you fancy yourself in the very presence where rainbows are furnished for a world. All the foliage too is dripping with the spray, and sparkling as with myriads of gems.

In this ride about the valley-bottom one finds time also to appreciate the uprightness and the downrightness of the surrounding cliffs. Their stupendousness grows upon one as he sees the fragments they have dropped—fragments large as the average church-edifice, and yet the face of the original rock scarce shows a flaw where once these fragments evidently rested. The fantastic forms of the rocks are appreciated also by one with a little poetry in his soul. The Three Brothers reminds one of three boys at play, leap-frog being the game, and instinctively one sighs to be a boy again, save only that the leap the boys seem about to take is a plunge of several thousand feet into the Merced River. Cathedral Rocks answer well to their name. The Spires are as fine a pair of twin spires as ever Nature carved; Art might do the work with more exactness, but certainly not with equal solidity. The Sentinel is indeed the overseer of the valley. Half Dome and the Dome are names which suggest themselves as the eye rests upon them. The designations South and North which they respectively bear are scarce needed. No one could question as to which peak is Cloud's Rest, nor which is The Captain (El Capitan), while the Royal Arches, Washington's Column, the Lost Arrow, and Liberty Cap are so well named that no change could be asked.

The ride to Mirror Lake is a favorite trip. Parties go there to see the sun rise. They need not, however, make a painfully early start. Lie abed till daylight has come; rise and dress deliberately, and get your breakfast; mount the hack at the door and ride up one of the head cañons, known as the Tenaya, about two miles, passing under the shadows of the Royal Arches, of Washington's Column, and of peaks which rear their heads above you a full half mile. In half an hour you reach the lake and stand upon the platform at the Lunch House. All is still; the little lake seems insignificant, but mark its mirror-like smoothness. No French plate ever presented a better surface. Every tree, nay every leaf, is perfectly reproduced upon its bosom. Every rock with its moss-patches and its fissures is duplicated. The heavens are mirrored below you, and an abyss deep as the heavens are high yawns at your feet. You are face to face with the perpendicular side of the Half Dome. Its peak is 4737 feet above you. You see its inverted summit in the mirror below you. But see that brightening of its top. It glows as if volcanic fires were about to burst from it. They do burst forth. The top is encircled in a spreading glory. You are dazzled; you close your eyes for the moment. You look again, and the peak is all right now, for the sun, though several hours high, has just risen beyond it. You pay fifty cents toll, and go home.

Ascending the trails on horseback is no very serious exploit even for the inexpert. They are steep, and in many places alarmingly rough, but the horses which climb them are well-drilled beasts. Their movements, if not interfered with, are automatic. Mount them, sit solidly, keep your equilibrium and your patience, and you will by and by reach your destination on the mountain-tops. All the desirable points about the valley may be thus approached. To reach some of them some hard hand-and-foot climbing must be done, but to most of them you can go without dismounting. Good footmen can reach any point with ease, saving horse-hire, but paying tolls and consuming more time. One of our party who wore an old-fashioned cork leg actually stumped his way to all the main peaks. In a few more years all these trails will be free. They have been built by private parties, who for compensation get toll for ten years. Then the work all reverts to the State.

A SWEEPING VIEW.

And now, before "Farewell" is said to this charmed scene, a general survey of its chief features may be appropriate. Entering the valley, El Capitan looms up upon the left a square, bold, clean block of granite 3300 feet in height from the valley-bottom. Opposite, and less than half a mile distant at the base, are Cathedral Rocks, 2660 feet high; the Spires rise 500 feet above this general altitude. Next beyond El Capitan are the Three Brothers, which lift their highest point 3830 feet above the valley. Nearly opposite these is The Sentinel, an obelisk-shaped rock towering to a height of 3043 feet. Still farther on upon the left is North Dome, 3568 feet above the valley. Nearly opposite this, Tenaya Cañon and Mirror Lake intervening, is Half Dome, 4737 feet high. Beyond, forming the background in this cañon, is Cloud's Rest, 6150 feet above the valley. Other grand peaks tower heavenward around the valley, but back from its rim, several of them being over 13,000 feet in height.

A final glance at the waterfalls and we leave the valley. Nearest to you as you stand on Inspiration Point is Ribbon Fall, which is a little rivulet trickling down the mountain-side and forming a pretty cascade, over 3000 feet in its entire altitude. A similar fall is near The Sentinel, and yet another on the opposite side of the valley, near its head. The water-supply of these falls is very small, however, and they dry out very early in the season. For height, however, they surpass all other waterfalls of the world. Bridal Veil, which lies just below Cathedral Rocks, has a descent of about 900 feet, two-thirds of this distance being in one clear leap, and the remainder being a steep cascade. For soft, gentle beauty this is the finest fall of the valley, and it is perennial. Almost opposite this, and sheltered by the flank of El Capitan, is another fall, almost the duplicate of Bridal Veil in appearance. It is in the guidebooks called Virgin's Tears, but in the valley they call it Widow's Tears, the drivers there affirming that it is so called because it flows for five or six weeks only.

Cascades and rapids of most superb character abound along the Merced. Above the valley, and below, a lover of the beautiful may tarry long, and long to tarry longer, amid the water-views. Cascade Falls, a few miles below the foot of the valley, is a point visited by many. Yosemite Fall is the peerless queen of the valley; it is so approachable, it presents so many different views, it is so lofty, so voiceful, so changeful, so grand. Its admirers sit and gaze upon it for hours in worshipful silence. One loves to lie and listen to it in the hours of night; and in the services of the Chapel in June, 1879, no moments were more impressive than when all sat in silence and listened to the voice of God in the waterfall.

Passing out of the valley proper, and following up the Merced River, the Illilonette Fall is seen in the distance spouting forth a strong but narrow current of water, which plunges some 600 feet into a little tributary of the main stream. Following the trail of the river, however, one is brought, after a hard climb, to "Snow's," a most comfortable hotel, surrounded by towering cliffs and perched above the torrent of the Merced just under the spray of the Nevada Fall. Here the river makes a plunge of 700 feet, and just below, at the Vernal Fall, it makes an unbroken leap of 400 more. Here is the holy of holies, so far as waterfalls are concerned. Immensity, wildness, power, grandeur, are elements which enter into the composition of one's experiences here. Your adjectives are all flat. You look and wonder; you look again and wonder more. Such a spot as Snow's is not to be found elsewhere.

One need not take the circuit of the trail to reach this heart of the Merced. If he be protected by waterproof clothing or care not for a wetting in ice-water, he may push up the river's brink to the very foot of Vernal Fall, and thence by a series of good, solid stairways he may ascend to the top, thus doing in half a mile what by the trail is five times as much. The writer took this shorter course, accompanied by a California lady. Compelled by the fury of the spray to pause frequently, the grandeur of the place steadily impressed itself upon us. The face of the fall, full four hundred feet in height and one hundred in breadth, was a mass of shimmering whiteness. It reminded of the "great white throne" of which the Revelation tells. The roar and dash of the many waters drowned out every human utterance. It reminded of the "voice of the archangel and the trump of God," at the sounding of which "every mouth shall be stopped." On either side the towering mountains shut us in, as at the last each man must be shut in with God before the throne. Rainbows of brightest hues and amplest breadth were playing everywhere, and we are told "there was a rainbow round about the throne." And not alone about the throne, but about us, who stood so insignificant there, these emblems of hope abounded. Gems of rarest lustre and richest color strewed the grass at our feet, dripped from the foliage about us, and glistened on our garments. One could but fancy himself at such a moment on the golden streets and amid the jewelled walls of the New Jerusalem. And here was one from the Atlantic shores and another from the Pacific! And is it not said, "They shall come from the east and from the west" to that fair city? And we who were there that day were mutually dependent upon each other for that gladdening fact. Neither would have gone alone, but each went because the other did. Let the lesson learned beneath this "Shower of Diamonds"—the Indian name for the Vernal Fall—be this: Let us all help each other to a hopeful place before the throne of God.

"While Nature's pulse shall beat the dirge of time
Thy domes shall stand, thy glorious waters chime.
Farewell, Yosemite! thy falls and sunlit towers
Will rise like visions on my future hours."

ALASKA.

BY BRET HARTE.

WHERE the short-legg'd Eskimo
Waddle in the ice and snow,
And the playful polar bear
Nips the hunter unaware;—
Segment of the Frigid Zone,
Where the temperature alone
Warms on St. Elias' cone;—
Polar dock, where Nature slips
From the ways her icy ships;—
Land of fox and deer and sable;—
Shore-end of our Western cable,—
Let the news that flying goes
Thrill through all your Arctic floes,
And reverberate the boast
From the cliffs of Beechey's Coast,
Till the tidings, circling round
Every bay of Norton Sound,
Throw the vocal tide-wave back
To the isles of Kadiak.
Let the stately polar bears
Waltz around the Pole in pairs,
And the walrus, in his glee,
Bare his tusk of ivory;
All ye polar skies, reveal your
Very rarest of parhelia;
Trip it, all ye merry dancers,
In the airiest of Lancers;
Slide, ye solemn glaciers, slide
One inch farther to the tide,
Nor in rash precipitation
Upset Tyndall's calculation.
Know you not what fate awaits you,
Or to whom the future mates you?
All ye icebergs, make salaam—
You belong to Uncle Sam.

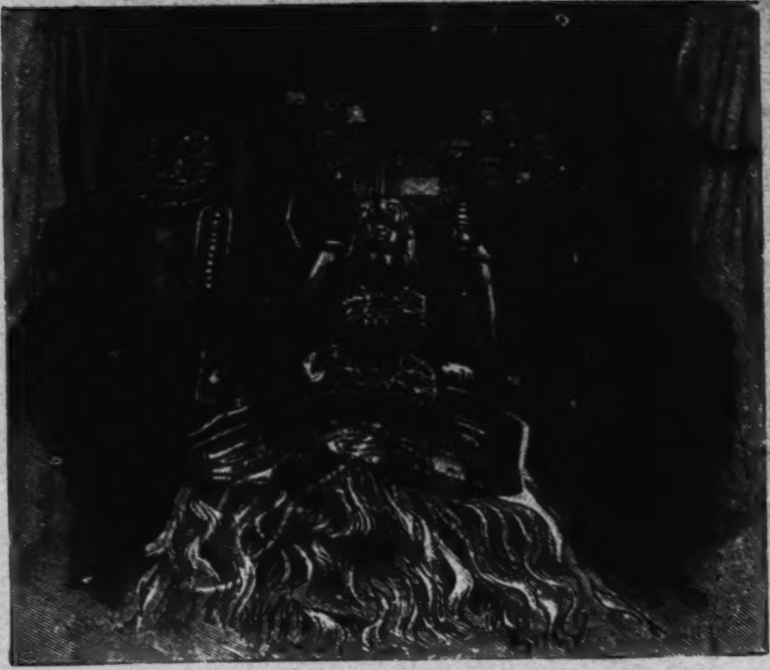
ALASKA AND ITS INHABITANTS.

BY REV. SHELDON JACKSON, D. D.

IT was sundown as the California steamed out of the harbor of Victoria. Instead of putting out to sea through the Straits of San Juan de Fuca, the steamer headed to the north-east through the Haro Strait, winding in and out among a thousand islands, until we entered the broader Georgia Straits, and for three hundred miles our course lay between Vancouver's Island and the main land, then between smaller islands and the main land, so that a trip of over a thousand miles is taken in salt water without ever getting to sea, the entire voyage being but little different from river-navigation. Entering Haro Strait, off to the east is San Juan Island, so long the boundary in dispute between the United States and Great Britain.

Far off to the east, Mount Baker stood in the twilight a great white pyramid covered with snow, notwithstanding its internal fires are still burning. Its crater is now filled up with ashes. During the night we crossed the forty-ninth parallel of north latitude, the imaginary line that separates the United States from the Dominion of Canada. In the morning we anchored at Nanaimo to take on coal for our long northern journey. The mines at this point during 1876 raised one hundred and forty thousand tons of coal.

Alaska is an English corruption of *Al-ak-shak* of the natives, meaning "the great land." It is indeed a great land, covering over five hundred and eighty thousand square miles. It is the great island-region of the United States, rivalling in number and size the great archipelagoes of the Southern Pacific. These islands cover a total area of thirty-one thousand square miles. Stretching along the Aleutian Islands for one thousand five hundred miles are sixty-one volcanoes, ten of which are active. The magnificent Shishalden—nearly nine thousand feet above



A DEAD INDIAN CHIEF LYING IN STATE, ALASKA.

EASTPORT, STICKEEN VILLAGE, FORT WRANGELL, ALASKA.

the waves that break on either base—Akuten, Makushin, and others, are belching out fire and smoke.

GLACIERS.

This is the great glacier-region. From Bute Inlet to Unimak Pass nearly all the deep gulches have glaciers, some of which are vastly greater and grander than any glacier of the Alps. The American student need no longer go abroad to study glacial action. In one of the gulches of Mount Fairweather is a glacier that extends fifty miles to the sea, where it breaks off, a perpendicular ice-wall three hundred feet high and eight miles broad. Thirty-five miles above Wrangell, on the Stickeen River, between two mountains three thousand feet high, is an immense glacier forty miles long, and at the base four to five miles across, and variously estimated at from five hundred to one thousand feet high or deep. Opposite this glacier, just across the river, are large boiling springs. The Indians regard this glacier as the personification of a mighty Ice God, who has issued from his mountain-home invested with power before which all Nature bows in submission. They describe him as crashing his way through the cañon where its glistening pinnacles bordered upon the domains of the River God, and that after a conflict the Ice God conquered, and spanned the river's breadth so completely that the River God was forced to crawl underneath. The Indians then sent their medicine-man to see how this could be avoided. The answer came that if a noble chief and fair maiden would offer themselves a sacrifice by taking passage under the long, dark, winding ice-arch, his anger would be appeased and the river be allowed to go on its way undisturbed. When the two were found and adorned, their arms bound and seated in the canoe, the fatal journey was made, and the ice has never again attempted to cross the river. At one of these glaciers ships from California have anchored and taken on a cargo of ice. It is also a great hot and mineral spring region; medicinal springs abound in sufficient number and variety to treat the diseases of the whole race. Goreloi, one of these, is a vast smoking caldron eighteen miles in circumference.

FISH.

All the early navigators and explorers, from Cook to the present time, have spoken of the immense numbers of salmon, cod, herring, halibut, mullet, ulicon, etc. There are no other such fisheries in the known world. A missionary thus describes a fishing-scene on the Nasse River: "I went up to their fishing-grounds on the Nasse River, where some five thousand Indians had assembled. It was what is called their 'small fishing.' The salmon-catch is at another time. These small fish form a valuable article of food, and also for oil. They come up for six weeks only, and with great regularity. The Nasse, where I visited it, was about a mile and a half wide, and the fish had come up in great quantities—so great that with three nails upon a stick an Indian would rake in a canoeful in a short time. Five thousand Indians were gathered together from British Columbia and Alaska, decked out in their strange and fantastic costumes. Their faces were painted red and black, feathers on their heads and imitations of wild beasts on their dresses. Over the fish was an immense cloud of sea-gulls, so many and so thick, as they hovered about looking for fish, that the sight resembled a heavy fall of snow. Over the gulls were eagles soaring about and watching their chance. After the small fish, had come up larger fish from the ocean. There were the halibut, the cod, the porpoise, and the fin-back whale. Man-life, fish-life, and bird-life—all under intense excitement. And all that animated life was to the heathen people a life of spirits. They paid court and worshipped the fish they were to assist in destroying, greeting them, 'You fish! you fish! you are all chiefs, you are.' The Christian Indians had their separate camps, where they had worship morning and evening, and kept the Sabbath."

FURS.

The principal fur-bearing animals of Alaska are the fox, marten, mink, beaver, otter, lynx, black bear, and wolverine. There are also the coarser furs of the reindeer, mountain-sheep, goat, wolf, muskrat, and ermine. The extent of the range and quality of the furs in that extensive Northern region is conducive to a very valuable fur-trade, in addition to which are the seal-fur fisheries, that since 1871 have yielded to the government an income of $1,891,030. Besides the fisheries and furs are the valuable deposits of coal, copper, sulphur, petroleum, and amber, with gold and silver. The gold and silver, so far, have been found only in limited quantities.

It is also the great lumber-region of the country. The forests of yellow cedar, white pine, hemlock, and balsam-fir will supply the world when the valuable timber of Puget Sound is exhausted. It has the great mountain-peak of the country (St. Elias), nineteen thousand five hundred feet high, and the great river of the country (the Yukon), one of the largest rivers of the world.

Alaska is naturally divided into three great divisions—the Yukon division, comprised between the Alaska mountains and the Arctic Ocean; the Aleutian district, comprising the Alaska peninsula and the Aleutian Islands; and the Sitkan district, including all the main land and adjacent islands south of the peninsula.

CLIMATE.

Each of these three great divisions has two climates—the coast climate and the interior climate, the latter being much severer than the former. The great Gulf Stream of the Pacific, known to geographers as the Japan Current, strikes and divides on the western end of the Aleutian Islands. A portion flows north into Behring's Sea, so that it is a remarkable fact that ice does not flow from the Arctic Ocean southward through Behring's Straits. The other portion sweeps southward and eastward, and makes the whole North-west coast habitable, giving to Southern Alaska, on the coast and the adjacent islands, a winter climate milder than that of New York City.

The Yukon district, bordering on the Arctic Ocean, is remarkable for one thing: from three to four feet below the surface there is a subsoil of frozen earth from six to eight feet deep. This phenomenon is ascribed to the want of drainage, together with a covering of moss that shields the ground from the hot sun of the Arctic summer; and yet, notwithstanding this icy subsoil, during the summer months there is a luxuriant growth of vegetation. The great distinguishing feature of this district is the wonderful Yukon River, two thousand miles long, navigable for steamers for one thousand five hundred miles. In some places on the lower Yukon one bank is invisible from the other. A thousand miles above its mouth it is, in places, twenty miles wide, including the intervening islands. It is one of the great rivers of the world, and upon its upper waters, within the Arctic Circle, is Fort Yukon, a post of the Hudson's Bay Company. At this far-distant post, which tidings from the outside world only reach once a year, is a Scotch missionary. The British Church looks well after its own people. On its banks live thousands who know neither its outlet nor its source, and yet, recognizing its greatness, proudly call themselves the "men of Yukon."

ST. PAUL.

The principal settlement is St. Paul, on Kadiak Island, but for political purposes Sitka was made the capital of the Russian colonies in America, and as such has enjoyed a prominence that has made its name as familiar as that of Alaska itself. It has the largest foreign population and the best houses in the Territory. But times are very dull there now, and some of its citizens and trade are removing to Fort Wrangell.

Cape Prince of Wales and the island of Alton are the extreme western points of land in the United States, in longitude 167° 59′ 12″—as far west from Portland or San Francisco as the extreme eastern point of Maine is east.

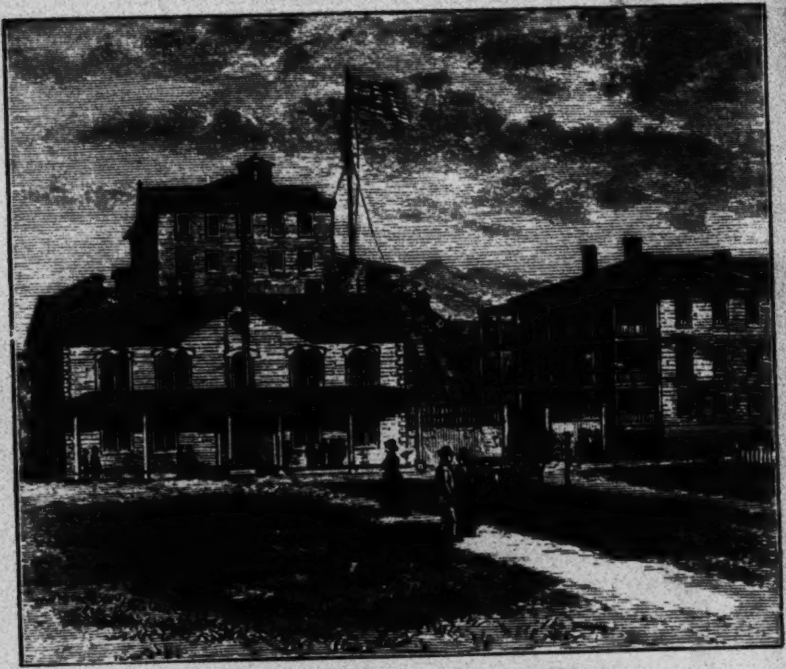
FORT WRANGELL.

This village of one hundred houses is on the north-western coast of Wrangell Island, at the mouth of the Stickeen River. Owing to the extensive gold-mines at Cassair, on the Stickeen River, it has become the chief business-centre of Alaska. The Cassair mines are employing this season about two thousand men, which creates considerable trade. For this trade Wrangell is at the end of ocean- and the commencement of river-navigation. Five ocean-vessels run between Portland and Wrangell and Victoria and Wrangell, and four small river-steamers run on the Stickeen River between Wrangell and the mines. The coast of Wrangell and the mouth of Stickeen River were first visited by the American ship Atahualpa of Boston in 1802, three years before Lewis and Clarke descended the Columbia. The permanent population is about one hundred whites and Russians and five hundred Indians. Besides these there are a large winter population of miners, and a floating Indian population of from five hundred to seven hundred more, there sometimes being from two thousand to three thousand Indians in the place. It is on the great highway of the Indians to and from the mines, also to their hunting and fishing. This makes it a central point for the establishment of a mission to the Indians, as parties from several large tribes are almost always in the village. And to this point the providence of God led the Presbyterian Church for the establishment of the first American Protestant mission in Alaska.

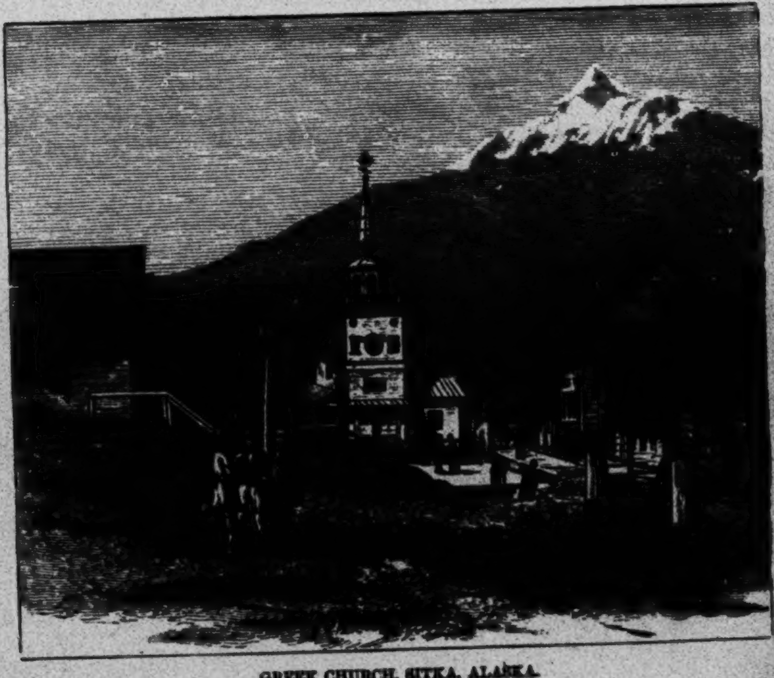
MISSION-WORK IN THE TERRITORY.

On the 10th of August, 1878, Mrs. A. R. McFarland and myself landed at Fort Wrangell, and commenced the Presbyterian mission in Alaska. Arranging for the work, and placing Mrs. McFarland in charge of it, with Clah (a Tsimpseau Indian Christian from Fort Simpson, B. C.) as assistant, and Mrs. Sarah Dickinson, a Christian Tongas, as interpreter, I returned to the East.

During the following fall and winter I published a lengthy series of newspaper articles and made public addresses in New York, Philadelphia, Washington, Chicago, St. Louis, and other large cities, creating such in-



GOVERNMENT BUILDINGS, SITKA, ALASKA.



GREEK CHURCH, SITKA, ALASKA.

terest in Alaska that twelve thousand dollars were contributed toward the establishment of mission-schools in that section. I also addressed the theological seminaries, and secured the appointment, by the Board of Home Missions, of Rev. John G. Brady of New York City for Sitka, Alaska; Rev. S. Hall Young of Parkersburg, W. Va., Rev. G. W. Lyons. I also secured a hearing before several committees of Congress in behalf of a government and schools for that section. This was followed up in the winters of 1879 and 1880.

The Methodists and Baptists have also arranged to enter the mission-field in Alaska in 1880.

NATIVE RACES.

The native races in Alaska number about twenty-five thousand; Russians, three hundred or four hundred; Americans and others, five hundred. The Indians can be divided into three great classes: the Innuit of Yukon district, the Aleutian, and the Tuski of the Sitkan district; and these again are divided into tribes, settlements, and families. These are largely in a condition of degraded superstition, and liable to all the horrible cruelties of heathenism. The old, sick, and useless are put to death with various cruel and disgusting rites.

The Indians are again subdivided into various families, each of which has its family badge. The badges are the whale, the porpoise, the eagle, the coon, the wolf, and the frog. These crests extend through different tribes, and their members have a closer relation to one another than the tribal connection. For instance, members of the same tribe may marry, but not members of the same badge. Thus, a Wolf may not marry into the Wolf family, but may into that of the Whale.

Upon all public occasions they are seated according to their rank. This rank is distinguished by the height of the poles erected in front of their houses. The greater the chief, the higher his pole. Some of these poles are over one hundred feet high. Mr. Duncan the missionary relates how upon one occasion a head-chief of the Nasse River Indians put up a pole higher than his rank would allow. The friends of the chief whose head he would thus step over made fight with guns, and the over-ambitious chief was shot in the arm, which led him to quickly shorten his stick.

Their houses are from twenty-five to forty feet square, without a window, the only openings being a small door for entrance and a hole in the roof for the escape of the smoke. The door is three or four feet above the ground-level, and opens on the inside upon a broad platform which extends around the four sides. This platform contains their rolls of blankets, bedding, and other stores. Some of the houses have a second platform inside the first and a few steps lower. Then a few more steps down bring one to the inside square on the ground floor, which is also planked, with the exception of about four feet square in the centre, where the fire is built on the ground; some few have a small inside room, looking as if it were a portion of the cabin of a wrecked vessel. The walls, and frequently roofs, are made of cypress plank from two to five feet wide and two to three inches thick. These planks are made by first splitting the trees into great planks, then smoothing down these planks with a small adze.

In front of their leading houses and at their burial-places are sometimes immense posts covered with carvings. (Those who attended the Centennial will remember such posts.) These are the genealogical records of the family. The child usually takes the totem of the mother. For instance, at the bottom of the post may be the carving of a whale, over that a fox, a porpoise, and an eagle, signifying that the great-grandfather of the present occupant of the house, on his mother's side, belonged to the Whale family, the grandfather to the Fox family, the father to the Porpoise, and he himself to the Eagle family. These standards are from two to five feet in diameter, and often over sixty feet in height, and sometimes cost from one to two thousand dollars. Formerly the entrance to the house was a hole through this standard, but latterly they are commencing to have regular doors hung on hinges. Among the Stickeens these badge-trees or totems are usually off to one side of the door.

ALASKA CANOES.

Alaska is celebrated for its canoes. Some of the largest of these canoes are from sixty to seventy-five feet long and eight to ten feet wide, and will carry one hundred people. One of these great canoes was on exhibition at the Centennial. The operation of making one is thus described: "Having selected a sound tree and cut it the desired length, the outside is first shaped, then the tree is hollowed out till the shell is of proper thickness; this is done with a tool resembling a grubbing-hoe or narrow adze with a short handle. It is then filled with water, which is heated by throwing in hot stones. The canoe is then covered with a canvas to keep the steam in—this softens the timber—and the sides are distended by cross-sticks to the desired breadth at the centre and tapering toward the ends in lines of beautiful symmetry. It is finished off with a highly ornamental figure-head, and the bulwarks strengthened by a fancy covering-board."

ORNAMENTS.

Many natives paint their faces with lampblack and oil, which gives them a very repulsive appearance. They have a great variety of household utensils, made from the horns of mountain-sheep and goats, from ivory, and from wood. Polygamy is common among the rich. Upon arriving at a marriageable age the lower lip of the girl is pierced and a silver pin inserted, the flat head of the pin being in the mouth and the pin projecting through the lip over the chin. Many of them, men as well as women, wear a silver ring in the nose as well as the ears. After marriage the silver pin is removed from the woman's lip, and a spool-shaped plug, called *labaret*, about three-quarters of an inch long, is substituted in its place. As she grows older larger ones are inserted, so that an old woman may have a plug two inches in diameter.

MARRIAGE.

A man wanting a wife sends a message to that effect to the girl's relations. If he receives a favorable answer he sends them all the presents he can procure. Upon the appointed day he goes to her father's house and sits down on the doorstep with his back to the house. The relations who have assembled there sing a marriage-song, at the close of which furs and calico are laid across the floor, and the girl is escorted over them from the corner where she has been sitting, and takes her seat by the side of the man. Then dancing, singing, and eating are kept up by the guests until they are tired. In these festivities the couple take no part. After this they fast for two days, and then after a slight repast they fast for two days more. Four weeks afterward they come together and are recognised as husband and wife.

POLYGAMY.

Polygamy, with all its attendant evils, is common among the Kadiaks. These wives are often sisters. Sometimes a man's own mother or daughter is among his wives. If a man's wife bears him only daughters, he continues to take other wives until he has sons. One of the Nasse chiefs is said to have had forty wives. After marriage they are practically slaves of their husbands. Their persons are at the disposal of visitors or travellers, guests of their husbands. They are sometimes, in Southern Alaska, sent to the mines, while the husband lives in idleness at home on the wages of their immorality. If ill-behaved, excessively lazy, or barren, they are sent away. Sometimes they are traded off by the husband for something he may desire. In childbirth, when needing the most tender care, they are driven out of the house as unclean, and kept for ten days in an uncomfortable hut without attention.

When a young girl arrives at maturity she is considered unclean. Everything she comes in contact with, and even the sky she looks upon, is considered unclean. She is therefore thought to be unfit for the sun to shine upon, and is confined for a year in a hut so small that she cannot stand upright in it. Only the girl's mother is allowed to approach her, and she only to bring her food. Around Sitka this period has been shortened to three months. At the close of this imprisonment she is taken out, her old clothes burned, new ones provided, and a feast given, during which a slit is cut in the under lip parallel with the mouth, and a piece of wood or shell inserted to keep the aperture extended.

In some sections all the work but hunting and fighting falls upon the women, even the boys transferring their loads and work to their sisters. Said a great chief, "Women are made to labor. One of them can haul as much as two men. They pitch our tents, make and mend our clothing," etc.

SLAVES.

And, as if their ordinary condition was not bad enough, the majority of the slaves are women. The men captured in war are usually killed or reserved for torture, but the women are kept as beasts of burden, and often treated with great inhumanity. The master's power over them is unlimited. He can torture or put them to death at will. Sometimes, upon the death of the master, one or more of them are put to death, that he may have some one to wait upon him in the next world.

BURIALS.

Between the houses and the higher land back of them are a number of boxes about five feet by two in size, raised on four posts a few feet from the ground; also small frame houses, like an old-fashioned smoke-house, four feet square. These are the graves of the chiefs and *shamans* (sorcerers). One of them was surmounted by a wooden figure of a whale ten feet long; another had a figure of an immense frog; others had the genealogy of the dead painted upon them.

The bodies of the dead are disjointed and burned. The funeral ceremonies of the wealthy often last four days. Dead slaves are cast into the sea. They believe in the transmigration of souls from one body to another, but not to animals. And the wish is often expressed that in the

INDIAN BURIAL-GROUND AT FORT WRANGELL, ALASKA.

UNITED STATES BONDED WAREHOUSE, FORT WRANGELL, ALASKA.

next change they may be born into this or that powerful family. Those whose bodies are burned are supposed to be warm in the next world, and the others cold. If slaves are sacrificed at a burial, it relieves their owners from work in the next world.

FOOD.

Their food consists largely of berries and fish. Large quantities of salmon are smoked and put away for future use. They also prepare large quantities of fish oil. Some years ago a party of them, having seen the cooks on ships mix up flour and bake it into bread, got possession of a barrel of lime from a shipwrecked vessel. A portion of this was mixed up as they had seen the cooks do, and baked and boiled and boiled and baked, but to their great disgust nothing eatable came from it.

WIDOW-BURNING.

Among the Nehaunes and Talcolins, when a man dies his widow is compelled to ascend the burning funeral-pile, throw herself upon the body, and remain there until the hair is burned from her head and she is almost suffocated. She is then allowed to stagger from the pile, but must frequently thrust her hand through the flames and place it upon his bosom, to show her continued devotion. Finally, the ashes are gathered up and placed in a little sack, which the widow carries on her person for two years. During this period of mourning she is clothed in rags and treated as a slave.

MURDER OF THE OLD AND FEEBLE.

Among the Chuckees the old and feeble are sometimes destroyed. This is done by placing a rope around the neck and dragging them over the stones. If this does not kill, then the body is stoned or speared and left to be eaten by the dogs. Occasionally the old ask to be killed. Then they are taken, stupefied with drugs, and, in the midst of various incantations, bled to death.

WOMEN DENIED BURIAL.

Among the Tuski and many of the Orarian tribes the bodies of good men are buried and the ashes carefully preserved. But in some sections, where wood is scarce, the bodies of women are not considered worth the wood that would be consumed in the burning, and they are either cast out to be consumed by the dogs, foxes, and crows, or cast into the sea as food for the fishes.

A summary cure for crying babies is to take them to the seashore and hold them in the water until they cease crying. As soon as they can walk children are bathed in the sea daily, and they learn to swim about as quickly as to walk. Festivals are given on erecting a new house, naming of children, marriages, deaths, etc. These festivals consist of dancing, singing, and feasting. Some of them are so expensive as to impoverish a whole circle of relatives.

SHAMANS.

Sorcery seems universal among all uncivilized people, prevailing alike in Asia, Africa, America, and the islands of the sea. The words and actions of the shaman are considered infallible. The office is often hereditary, the son inheriting from the father the various paraphernalia of drums, rattles, masks, charms, etc. The young man that would become a shaman, according to Dall, secludes himself for a time in the woods, living on roots. He then claims that a master-spirit has sent an otter to him, which he kills. The skin of the otter becomes his badge of office; the tongue is placed in a bag prepared for the purpose and carefully concealed as a charm, for was an uninitiated person to look upon it he would immediately lose his senses. If solitude and low diet do not bring power, the young shaman spends a night at the grave of an old shaman, taking a tooth or finger from the corpse and holding it in his mouth to more readily compel the attendance of the spirits. The honor of the shaman depends upon the number of spirits he can control. He has a separate mask, songs, and dances for each. His hair is never to be cut.

From Dall we also receive the following specimen performance: "On the day appointed for the exhibition of his power his relations, who act the part of a chorus of singers, are obliged not only to fast, but also use a feather as an emetic to free themselves entirely from food. The performance commences at sunset and lasts until sunrise. All who wish to participate assemble in the lodge of the shaman, where they join in a song, to which time is beaten on a drum. Dressed in his paraphernalia, with a mask over his face, the shaman rushes round and round the fire which is burning in the centre of the lodge. He keeps his eyes directed toward the opening in the roof, and keeps time to the drum with violent motions of his limbs and body. These movements gradually become more convulsive; his eyes roll until the whites alone are visible. Suddenly he stops, looks intently at the drum, and utters loud cries. The singing ceases, and all ears are strained to catch the utterances, which are supposed to be inspired. By changing the masks he places himself *en rapport* with the spirit to which each mask is dedicated. It is believed that this spirit inspires for a moment all the utterances, which are supposed to be sacred."

When a shaman dies his body is left for a day in each of the four corners of his room; on the fifth day it is carried out, dressed in the costume of his order, and deposited in one of the small burial-houses spoken of previously. His body is not burned.

CANNIBALS.

The Indians are held in abject fear of the conjurers or medicine-men. Some of the scenes to be constantly witnessed on that coast are thus depicted by Mr. Duncan of the Church Missionary Society, British Columbia: "The other day we were called upon to witness a terrible scene. An old chief in cold blood ordered a slave to be dragged to the beach, murdered, and thrown into the water. His orders were quickly obeyed. The victim was a poor woman. Two or three reasons are assigned for this foul act. One is, that it is to take away the disgrace attached to his daughter, who has been suffering for some time with a ball-wound in the arm. Another report is that he does not expect his daughter to recover, so he has killed this slave in order that she may prepare for the coming of his daughter into the unseen world. I did not see the murder, but immediately after saw crowds of people running out of the houses near to where the corpse was thrown, and forming themselves into groups at a good distance away, from fear of what was to follow. Presently two bands of furious wretches appeared, each headed by a man in a state of nudity. They gave vent to the most unearthly sounds, and the two naked men made themselves look as unearthly as possible, proceeding in a creeping kind of stoop and stepping like two proud horses, at the same time shooting forward each arm alternately, which they held out at full length for a little time in the most defiant manner. Besides this, the continual jerking of their heads back, causing their long black hair to twist about, added much to their savage appearance. For some time they pretended to be seeking for the body, and the instant they came where it lay they commenced screaming and rushing around it like so many angry wolves. Finally they seized it, dragged it out of the water, and laid it on the beach, where they commenced tearing it to pieces with their teeth. The two bands of men immediately surrounded them, and so hid their horrid work. In a few minutes the crowd broke again, when each of the naked cannibals appeared with half of the body in his hands. Separating a few yards, they commenced, amid horrid yells, their still more horrid feast of eating the raw dead body. The two bands of men belonged to the class called 'medicine-men.'

"I may mention that each party has some characteristic peculiar to itself, but in a more general sense their divisions are but three—viz. those who eat human bodies, the dog-eaters, and those who have no custom of the kind. Early in the morning the pupils would be out on the beach or on the rocks in a state of nudity. Each had a place in front of his own tribe, nor did intense cold interfere in the slightest degree. After the poor creature had crept about, jerking his head and screaming for some time, a party of men would rush out, and, after surrounding him, would commence singing. The dog-eating party occasionally carried a dead dog to their pupil, who forthwith commenced to tear it in the most doglike manner. The party of attendants kept up a low growling noise or a whoop, which was seconded by a screeching noise made from an instrument which they believe to be the abode of a spirit. In a little time the naked youth would start up again and proceed a few more yards in a crouching posture, with his arms pushed out behind him and tossing his flowing black hair. All the while he is earnestly watched by the group about him, and when he pleases to sit down they again surround him and commence singing. This kind of thing goes on, with several different additions, for some time. Before the prodigy finally retires he takes a run into every house belonging to his tribe, and is followed by his train. When this is done, in some cases he has a ramble on the tops of the same houses, during which he is anxiously watched by his attendants, as if they expect his flight. By and by he condescends to come down, and then they follow him to his den, which is marked by a rope made of red bark being hung over the doorway, so as to prevent any person from ignorantly violating its precincts. None are allowed to enter that house but those connected with the art; all I know, therefore, of their further proceedings is, that they keep up a furious hammering, singing, and screeching for hours during the day.

"Of all these parties none are so much dreaded as the cannibals. One morning I was called to witness a stir in the camp which had been caused by this set. When I reached the gallery I saw hundreds of Tsimpsean sitting in their canoes, which they had just pushed away from the beach. I was told that the cannibal party was in search of a body to devour, and if they failed to find a dead one, it was probable that they would seize the first living one that came in their way; so that all the people living near to the cannibal's house had taken to their canoes to escape being torn to pieces. It is the custom among these Indians to burn their dead, but I suppose for these occasions they take care to deposit a corpse somewhere in order to satisfy these inhuman wretches.

"These, then, are some of the things and scenes which occur in the day during the winter months, while the nights are taken up with amusements —singing and dancing. Occasionally the medicine-parties invite people to their several houses and exhibit tricks before them of various kinds. Some of the actors appear as bears, while others wear masks, the parts of which are moved by strings. The great feature in their proceedings is to pretend to murder, and then to restore to life, and so forth. The cannibal, on such occasions, is generally supplied with two, three, or four human bodies, which he tears to pieces before his audience. Several persons, either from bravado or as a charm, present their arms for him to bite. I have seen several whom he has thus bitten, and I hear two have died from the effects."

* * *

ALASKA.

BY IVAN PETROFF.

THE greatest of the Territories of the Great West, in size, is Alaska, with its stupendous area of five hundred thousand square miles and a length of coast-line, including islands, that reaches far into the thousands of miles. A bold semicircle embracing fifty degrees of longitude affords a firm hold upon the North Pacific, while another sweeping curve commands the Behring Sea, so that the only thing lacking to make Alaska a territory of the highest strategical importance and the North Pacific an American sea is the absorption of British Columbia in the United States —an event that may be looked for with certainty in the future.

EARLY HISTORY.

Though occupied by the Russians for a century before falling into our hands, Alaska is still in the first stages of development. Its population is not as large now as it was when Behring and Chirikoff gave to the world the knowledge of the north-western extremity of this continent in 1741. For half a century the islands and a few points on the main land were ruthlessly stripped of their fur-bearing animals by *Promyshleniks*, the semi-savage hunters and trappers of Siberia, who navigated these waters in the most wretched craft in search of valuable furs. They were commercial freebooters—robbers under pretext of a legitimate business—who respected no rights which the native inhabitants might have claimed. Whole villages and tribes were compelled by force of arms to send out all able-bodied hunters to labor for the invaders, who in the mean time enjoyed their leisure in settlements containing only women and children. Even the illiterate traders of those times perceived that such proceedings would speedily put an end to all business in their new field of operations. Influence was brought to bear upon the Russian government, and by the end of the last century all that region now called Alaska, together with a portion of the opposite coast of Asia and the Kurile Islands, was given into the hands of one powerful corporation, the Russian American Company.

The chaos of crime and anarchy theretofore existing was gradually changed into the strictest discipline and order, and wherever the fur-bearing animals had not become entirely extinct their number was slowly made to increase again by careful and systematic management. But while one of the chief resources of the country was being thus carefully nursed and made to support the people, no other item of natural wealth was looked for, or even allowed to develop itself. The nature of the fur-trade is not such as to stimulate immigration into the region where it is carried on; the deepest solitude is necessary to its prosperous prosecution; and consequently during the long reign of the Russian monopoly—which was absolute, with almost sovereign rights—there was no increase of population, no industrial development.

In this condition the Russian colonies in America remained until the discovery of gold in California, when some attempts were made to furnish not only Russian manufactured goods, but lumber and fish, for the new market with its rapidly-increasing demand. The first ventures of this kind met with success, but gradually bad management and competition curtailed the profits, and the shipments were discontinued. Then, with the assistance of another company, organized in San Francisco, experiments on a large scale were made in working the coal-veins of Cook's Inlet and Ounga Island and carrying ice to the rapidly-growing metropolis of the Pacific. One of the governors of the colony, a mining engineer, entered into a contract with the company to develop the copper-ledges on Copper River and any other mines he might discover. But all these enterprises came to nothing, owing partly to the unsettled state of affairs when the third term of the company's charter expired in 1861. The corporation refused to renew the contract without some change of conditions, to which the government could or would not agree, though unwilling to assume control of the colony, that had until then been wholly supported by the company without any expense to the imperial treasury.

When at last a way out of the difficulty was pointed out by an offer on the part of the United States to purchase the territory, Russia was only too glad to accede to the proposition, and after some diplomatic skirmishing and a spirited fight in our national legislature the territory was purchased in 1867 for the sum of seven million two hundred thousand dollars.

GENERAL DESCRIPTION.

To convey to the reader an adequate idea of what this our latest acquisition really is, it is necessary to describe it in sections, the Territory as a whole being too vast in dimensions, and too widely differing in the nature and resources of its component parts, to admit of being treated collectively.

The only section of Alaska now open to the tourist by means of regular mail-communication is the labyrinth of islands extending from the boundary-line, under latitude 54° 40′ N., along the coast in a north-westerly direction as far as Sitka, or Baranof Island. To the visitor beholding this region from the deck of a passing steamer it appears a mass of abrupt peaks, gathered in chains or forming separate islets, densely wooded from base to summit, varying in elevation from one thousand to five thousand feet above the sea, and even attaining to a greater height on some of the larger islands. For hundreds of miles not an acre of level ground is visible. Fleecy banks of fog climb up the towering heights in lines of battle, one after the other, only to descend on the other side, as if powerless to resist the attraction of kindred moisture latent in the rank vegetation and moss-covered soil. Cascades white with foam descend the sombre-hued declivities, appearing like living satin ribbons fluttering down from the mountains' snowy caps into the deep-green water of almost bottomless channels and reaches. Here and there a "slide" has left an ugly scar across the face of a verdant island, but the mark of the axe is nowhere to be seen. Timber sufficient in quantity to supply generations of a dense population with fuel and lumber is apparently wasted here, with no other effect than to make the interior impenetrable to traveller, prospector, and hunter alike.

But, wild as this part of the Territory appears, it is by no means without value. Food-fishes of various kinds, the staple provender of millions on the other side of the Pacific, abound here in great profusion, ensuring a constant increase of supply corresponding with that of demand for ages to come—a wealth that will become available long before the product of Alaskan forests can pay for labor and transportation. Scientific examination of well-known geologists has established the fact that the rugged mountains on this part of the coast and the hundreds of rocky islands scattered along its curves are outrunners of the same gigantic chain that has poured into the lap of the world the countless millions of Comstock bullion.

SETTLEMENTS.

Wrangell, the first settlement worthy of the name that greets the traveller entering Alaska from the south-east, bears the name of one of the former governors of the Russian possessions, who was also an admiral of the imperial navy and an Arctic explorer. The Russian Company had established a trading-post here, named the Redoute St. Dionys, which, together with a strip of the continental coast as far north as the Takoo River, was leased for years to the Hudson's Bay Company. In 1867 the Russian buildings were already in an advanced stage of decay, and the military authorities of the United States erected a fort near by, which was named Fort Wrangell. A village of traders sprang up between the native settlement and the fort, and became known under the same appellation. For years Fort Wrangell has existed, and to a certain extent prospered, upon the transit-trade between British Columbia and the Cassiar mining district, which up to last year necessitated a transshipment of all goods at Wrangell from ocean- to river-craft. The United States bonded warehouse did a lucrative business, and the merchants, who were not above turning an additional penny in smuggling operations, were flourishing correspondingly. Last year, however, a severe blow fell upon the little community. Business-men of Victoria, B. C., built a side-wheel steamer of such light draught as to permit it to proceed up the Stickeen River and land English goods just beyond the boundary-line, and with a defiant whistle the Western Slope paddled by the astonished and much-dismayed traders of Wrangell before they had fairly realized that the thing was possible. The Americans interested in the Cassiar trade justly claim that the boundary was arbitrarily located by English surveyors for this very purpose, but several petitions on the subject have heretofore received no attention from our State Department.

The village of Wrangell is decidedly "rough," in appearance as well as with regard to the character of its inhabitants. Ten stores, with intervening dwellings and saloons, describe an irregular curve along the beach, flanked on either side by long rows of Indian houses. What should be the street is only a swampy receptacle of filth and garbage, with hogs and crows as the only scavengers. Winter cabins of miners and shanties of semi-civilized natives and half-breeds dot the space intervening between the stores and a steep wooded hill, the buildings being located with a view to avoid all interference with stumps and boulders. The "fort," with its substantial building erected by the government, has fallen into private hands, and the only other structures of any pretension are the custom-house (a weatherbeaten one-story frame cottage), a Roman Catholic church, and a church and other buildings constructed last year by the Presbyterian mission. Both organizations have gained adherents among the resident and visiting Indians of the vicinity, but so far the Presbyterians, under superintendence of Rev. H. S. Young, have met with the greater success. All the rough lumber for the buildings was supplied by a sawmill on Prince of Wales Island, not very far from Wrangell. With the exception of a few men engaged in curing and exporting herring and codfish, the people of the town now depend almost entirely upon the fur-trade with the Indians for their subsistence.

The present terminus of the only Alaska mail-route is Sitka, the former seat of government, and now the residence of the collector of customs. The quartz-ledges in the immediate vicinity of Sitka, now fast being developed and making shipments of bullion, have caused a considerable increase of population during the past year. A large number of miners who had been disappointed in the Cassiar diggings have located at Sitka, and prospecting is carried on extensively and in the most thorough manner. One mill of ten stamps, worked by steam-power, is in active operation on the Stewart Ledge, owned by Oregon capitalists, and several other firms are about to purchase machinery for their respective ledges. A salmon-canning establishment has been in operation for several years with gratifying success under the auspices of Cutting & Co. of San Francisco.

The town of Sitka is far superior to Wrangell in appearance and dimensions. Under the Russian rule buildings were erected in the most substantial manner, and those in private hands are still in a good state of preservation, but nearly all the government houses are sadly in need of repairs.

The abundance of fish in the harbor of Sitka, especially the immense swarms of fat herrings that throng the water in their season, attracts large numbers of natives from other islands, and even from the continent. At such times the Indian village adjoining the town doubles and trebles its usual population of from eight hundred to a thousand, and as these visitors bring with them a quantity of valuable furs to exchange for goods, dried fish, and oil, the business-men of Sitka derive benefit from the fish in their harbor in more ways than one.

It is difficult to ascertain the exact population of the town, which has of late been much increased by an influx of miners and prospectors, who may or may not become permanent residents. The creoles and Russians, or the members of the Russian Church, number about three hundred, while the representatives of other nationalities at present probably exceed that number.

The Russian cathedral, of very modest external appearance, displays in its interior and ecclesiastic paraphernalias something of the former grandeur of the capital of Russia's possessions in America. A school for both creole and American children is maintained by the joint efforts of citizens and the officer in command of the man-of-war stationed in the harbor.

From Sitka northward and westward the coast describes a semicircle about six hundred miles in diameter. The eastern half of this curve is almost inaccessible and presents the most forbidding appearance. Glaciers extend from the stupendous mountain-ridges to the sea, filling the valleys and ravines, and on every hand the forest bears marks of the storms that expend their fury on these shores after traversing the vast Pacific, and of the slow but irresistible encroachment of glacier ice. Up to the mouth of Copper River this range of country is uninhabited, except in the far interior, but in the northern part of the vast bight now under contemplation, familiarly known as Prince William Sound, a more deeply-indented coast-line and numerous islands have served to attract and maintain a sparse population of seal and sea-otter hunters, scattered in minute settlements over a large area, with Fort Constantine, on Nuchek Island, as their central and business place. Two rival trading-firms maintain establishments here, and are visited at certain seasons by Indians from the head-waters of Copper River in canoes loaded down with beaver and otter skins; but all attempts to locate trading-posts on that river, or to examine the deposits of copper known to exist there, have so far been firmly resisted by the natives. To the credit of the latter it must be acknowledged that they have contented themselves with robbing the intruders of their possessions and sending them about their business, without resorting to further acts of violence.

On the western side of the Sound, or on the east coast of the Kenai Peninsula, the shore is indented by deep harbors and covered with a luxuriant growth of spruce forest. Here the Russians built as early as 1794 a three-masted ship, the first of that class ever constructed on the Northwest coast. The ship was named the Phœnix, and made many voyages between the Russian possessions on both continents.

West of the Kenai Peninsula lies the spacious arm of the sea known as Cook's Inlet, named after the famous navigator, who entered it in the hope of having discovered the long-sought passage from the Pacific into Hudson's Bay or the Atlantic. After some futile efforts to penetrate in an easterly direction, Cook considered that he had found only the mouth of a large river, and the true nature of that sheet of water was not proclaimed to the world until Vancouver's visits in 1793 and '94, though the Russians had been thoroughly acquainted with the facts for many years prior to that period.

Cook's Inlet has been called by superficial observers the "Garden of Alaska," simply because from the deck of a steamer they saw vast verdant plains on its eastern shore. An examination of these "enchanting prairies" proves them to be morass covered with grass, moss, and heather, and a further investigation of the soil with the help of a spade will produce frozen earth and ice at a depth of eighteen or twenty inches even in midsummer. Nevertheless, potatoes and other hardy vegetables are cultivated at various points on the Inlet, but it is done only on the banks of ravines or other slopes with a southern exposure, affording an opportunity to the sun to thaw and heat up the surface. The timber on the east coast is stunted, but increases in size as one advances into the interior. The west coast of the Inlet is mountainous and densely wooded. Several volcanic peaks loom up to towering heights, proclaiming their vitality by occasional puffs of smoke and rumbling noises. Sulphur deposits and indications of silver-ore have been found in these mountains, and the forests abound in game.

The inhabitants scattered in small villages around the whole Inlet do not exceed six hundred in number, and are mostly creoles and natives. A little settlement of five Russian families, descendants of former employés of the Russian Company, exists on the east coast at the mouth of a small stream, and is named on our maps Fort St. George, though the real name of the place is Niniltchik.

The salmon caught in all rivers and creeks emptying into the Inlet are of excellent quality and truly magnificent size, specimens weighing from eighty to one hundred pounds being by no means of rare occurrence. The "run" of the salmon in this neighborhood continues from the end of May to the end of July.

Two trading-firms have permanent stations at various points on Cook's Inlet, and a third, located at Kadiak, scours the coast regularly with small schooners—a state of affairs that momentarily benefits the natives, who receive absurdly high prices for their furs, while it drives the traders to resort to trickery in order to make any profit at all; and added to these unsatisfactory results must be certain extirpation of fur-bearing animals to supply the demand at fancy prices.

At English Bay, near the mouth of the Inlet, the Russians expended much time and money in developing the coal-veins. A thorough test proved the quantity to be all that could be desired, but the work was much impeded by water, the vein dipping below the level of the sea, but a few hundred yards distant. The principal reason for abandoning the work was, however, the inferior quality of the coal and the impossibility of finding a market for it.

South of Cook's Inlet, and only five hundred and fifty miles in a direct line from Sitka, is the island of Kadiak (mistakenly named Kodiak). This, with the adjoining Afognak and Wood Islands, forms the most agreeable and pleasant section of the Territory as a place of residence. The winters are less cold than at Cook's Inlet, and the summers less moist and overcast than at Sitka. The soil, also, is far superior to that of either of the places mentioned, enabling hundreds of families to cultivate potato-patches and vegetable gardens as a most acceptable addition to the products of sea and forest. The comparatively dry summer permits the conversion of the luxuriant grasses into hay for the subsistence of beef-cattle during the winter, and in some sheltered valleys the animals find their own feed all through the year. Salmon and codfish throng the waters in incredible quantities.

The principal port and the residence of a deputy collector of customs is at St. Paul, a village of five or six hundred inhabitants. The settlement was founded at the end of the last century, and was the seat of government of the Russian colonies until the subsequent establishment of Sitka. Some of the old buildings, constructed of logs of gigantic size, still remain, but a majority of the houses are new and quite neat, and altogether the village would compare favorably with most European fishing-hamlets in outward appearance.

At Afognak, separated from the north end of Kadiak by a narrow strait, there is quite a large settlement of creoles, whose "acres" have been transmitted from father to son for several generations. They sell potatoes, turnips, hay, and butter, and many of them are expert boat-builders, and are patronized by fishermen and traders in all that section of country. On Spruce and Wood Islands the settlements are composed chiefly of Aleuts, who rely more upon the sea for their subsistence, though small gardens are attached to most of the houses. At the last-named point a firm familiarly known as the "Ice Company" (its official name is the American Russian Commercial Company) has a complete and extensive ice-packing establishment. Of two large ice-houses, capable of holding thousands of tons, one is annually filled, but under an agreement with San Francisco ice-producers (probably for a consideration) no shipments have been made for over ten years. This company also has a large store, some outlying stations, and sends out hunting-parties in quest of sea-otters. A sawmill serves the double purpose of furnishing sawdust for packing the ice and of providing the treeless portion of Western Alaska with rough lumber. The only span of horses west of Sitka is attached to this establishment.

Two other firms, the Alaska Commercial Company and the Western Fur and Trading Company, have stores at St. Paul village and various points on the island, and competition in that line is made still more brisk by occasional visits of whalers, private traders, and fishermen, who all combine in forcing upon the lucky natives the highest possible prices for their furs. Another source of income for the more industrious among the inhabitants of Kadiak is the cutting of cordwood for the trading-stations located westward and southward of the timber-line.

From Kadiak southward extends the range of "sea-otter grounds," the region where that most valuable among the fur-bearing animals of Alaska is chiefly found. The islands and main land of all this section, extending to the western extremity of the Aleutian chain (and also of the United States), are entirely devoid of trees; the soil still produces grass, flowers, and a variety of berries, but potatoes and vegetables do not succeed, as they do farther to the north. At the Shumagin Islands, about three hundred miles south of Kadiak, the fishing-craft of San Francisco reap their rich harvest of codfish every year, and could easily increase their catch tenfold could they but find a market for it. The fishermen have a permanent station here bearing the romantic name of Pirate Cove, where they collect the catch of small boats, partially cure the fish, and then ship them to San Francisco.

Some ten or twelve white men (American and English) have settled at Delarof Harbor, Ounga Island, and married native women, and on the strength of their intimate alliance with the aborigines they have been granted the privilege of hunting sea-otters, reserved to the people of the country by an existing most wise and just regulation of the Treasury Department. As these men employ firearms and other devices apt to annihilate or frighten away the precious animals, they are not looked upon with favor by their neighbors.

A coal-mine has been prospected and worked "by fits and starts" for many years at Humboldt Bay, island of Ounga, but has been finally abandoned as unprofitable.

The most lucrative of all the sea-otter grounds is on and about the island of Sanuakh, near the southern end of the Alaskan Peninsula. The island is very difficult of approach, uninhabited, and surrounded by outlying rocks, and probably for all these reasons it was selected as a breeding-place by the sagacious sea-otter. Hunting-parties from all parts of that section of the Territory are attracted to this spot, and a large settlement has been established at a most desolate spot on the main land not far distant. This village, Belkovsky, is composed of creoles and Aleuts, who may be called the wealthiest people in the Territory—that is, they handle the most money—but they are also very dissipated, depraved in their tastes and morals, and their riches lodge in their hands only in transit to the strong-box of the traders. In addition to the agents of trading-firms permanently located at Belkovsky, a number of vessels clear every season for whaling and fishing voyages from San Francisco, with the sole object of cruising about these waters and "picking up" sea-otters by trading or hunting with men shipped for that purpose. The temptation to pursue the sea-otter in every possible way is very great, in view of the great commercial value of the skin; but what is to become of the natives of this region, which offers them absolutely no other source of revenue, or even of subsistence, when this animal shall have been exterminated? That is a problem to be solved by some generation not very far removed from our own.

The chain of the Aleutian Islands, extending westward from the southern point of Alaska Peninsula for over eight hundred miles, contains but three settlements of any importance—Oonalashka, Atkha, and Attoo, on islands of the same names. The population of the whole archipelago is thirteen hundred souls, all engaged in the same pursuit—fishing for their immediate means of subsistence, and hunting sea-otters in order to obtain the wherewith to purchase clothing and other necessaries. The islands produce grass and berries, but the soil is rocky and the winters long, while a cloudy sky is the rule and clear weather the exception. Terrific gales sweep the islands from north and south, and the only fuel within reach of the inhabitants is the heavy, sodden wood of drift-logs carried from southern climes by ocean-currents and the coal and cordwood imported by the traders. The latter article is sold as high as ten cents for a single stick. This region has been spoken of as capable of supporting vast herds of cattle and of shipping dairy produce, but the absence of fuel and building-material, and the severe winters, will prevent immigration of dairymen for some time to come, and the natives will never toil all summer to provide a few cows with hay as long as they can gain their livelihood by a few weeks of sea-otter hunting and fishing, and live in idleness the remainder of the year.

At Oonalashka a deputy collector of customs is located, and during the summer the harbor, with its substantial wharf and warehouses and many good buildings, presents quite a lively appearance. Vessels are entering and leaving almost daily from March till the first days of November, but after that the village relapses into the discomforts of snow, solitude, and wintry gales.

The coast of the main land northward from Oonalashka is generally low and barren. All along the northern side of Alaska Peninsula there is a series of sandbanks and shoals much frequented by walrus, but relentless pursuit of these animals by whalers who fail to "strike oil" in their legitimate game foreshadows a time when the walrus, like the sea-cow, will be a being of the past, and ivory will rise to fabulous prices.

Two rivers, the Nushagak and the Kuskokvim, discharge their waters into that vast bight of Behring's Sea called Bristol Bay. They abound in fish, and their lower course, for some twenty or thirty miles from the mouth, is thickly studded with Aleut villages, whose inhabitants live chiefly by the sale of fish and oil, and trade with the Indians of the interior. Trading-posts have been established at the mouth of each of these rivers, and a flourishing mission of the Russian Church numbers several thousand members.

The mountains between these rivers and the Yukon have never been traversed by competent explorers, but indications of minerals—cinnabar and graphite—are reported as existing there.

From the Kuskokvim northward to the mouth of the Yukon and St. Michael, the *ultima Thule* of permanent coast trading-posts, the seashore is almost uninhabited, but the Indians from the upper Yukon move temporarily to the vicinity of the coast during the fishing season. At St. Michael, and on the main land immediately opposite, the agents of the two principal firms engaged in the Alaska trade have located themselves, doing considerable business by fitting out private traders, who visit the interior and there purchase the furs obtained from the natives. Each firm also sends a small steamer, of less than fifty tons, once a year to Fort Yukon on the river of the same name, eleven hundred miles above its mouth, with supplies and goods for the traders. Small as these steamers are, they can enter but one of the many outlets of this mighty river, exceeding the Mississippi in size and volume of water. All the other arms, extending over seventy miles of the coast, are not navigable, owing to shallow water and shifting sands.

Both Russian and Roman Catholic missionaries have labored among the savage tribes inhabiting the vast basin drained by the Yukon, but the result has not been very encouraging. The whole region, though densely wooded as a rule, has an annual mean temperature below the freezing-point, and agriculture is of course out of the question. Game is still abundant, but fur-bearing animals—the beaver, fox, and marten—are decreasing year by year; and what will be the future of this vast solitude must at present remain an unsolved problem.

A trade that once assumed quite formidable dimensions between these Indians and the natives of the coast of Asia, across Behring's Strait, is also fast declining, owing to the facility with which the latter people obtain the most coveted articles of trade from whalers visiting their coast, without undertaking a long and dangerous journey to neighbors who were ever ready to take by force what they could not obtain at their own price.

From St. Michael northward, and along the Arctic to the boundary-line, the Eskimo reigns supreme, and buys his own destruction (bottled up) from the "honest whaler" at the highest price, without the least danger of interference by customs or other authorities.

THE PRIBYLOF OR FUR-SEAL ISLANDS.

Having carried the reader along the whole coast of the Territory, we cannot close our review without at least a cursory glance at two little islands in the Behring Sea, diminutive in size and almost continually hidden in fog, but exceeding just now in commercial importance all the remainder of our northernmost domain.

These islands, discovered by the Russian navigator Pribylof, and named after him, but now familiarly known as the Fur-seal Islands, form an item in our national revenue that reconciles, or ought to reconcile, the most obstinate opponents of the Alaska purchase. Even now, thirteen years after the acquisition of the Territory and ten years after the lease of the islands in question by contract, the government has pocketed in cash, without any expense of collection worth mentioning, over half of the sum paid to Russia for all Alaska, and there is no reason why this state of affairs should not continue until the people of the United States have been fully reimbursed.

A locality of such importance to our treasury will bear a more detailed description and review in its various aspects.

When Pribylof discovered the islands he found them uninhabited, but literally covered by millions of seals. Sea-otters were also plenty at that early day, but, as the more valuable of the two animals, they were promptly exterminated to the last specimen by the greedy Russians, who knew little of the possible commercial value of the seal. A force of laborers was left on the islands, and when a market was found in China for the fur-seal the killing—or rather the slaughter—began in earnest. In a few years millions were despatched, and half of the skins were spoiled for want of proper care, and thrown into the sea. This course was pursued even for some years after the Russian American Company obtained supreme control of the country, and the valuable animal was all but extinct when a far-seeing official of the company introduced a new system of management, and for many years at a time the seals were not disturbed at all, until a gradual increase became evident. But during all the long years of Russian rule a very moderate use was made of what subsequently proved to be a mine of wealth, and, in consequence, the seal-rookeries, as they are called, were in a very flourishing condition when Russia transferred her proprietary right to the United States.

In early times life on these islands was exceedingly dreary and beset with hardships. Aleuts were taken there "by order" of the company, but often against their will, and they always embraced the first opportunity of returning to their homes. Their many complaints preferred on this subject finally caused the establishment of a rule that parties of Aleuts on these islands should be relieved at least every two years. This rule was strictly observed, and up to the time of the transfer not one of the sealers employed by the Russian Company had ever dreamed of claiming any proprietary right in either islands or seals. With the withdrawal of the old company, however, enterprising American traders flocked to the islands, and in their rivalry and for purposes of their own they began to "buy" sealskins of the former employés, in place of paying them for their labor. The business was new and competition exceedingly brisk, and there was a fair prospect of seeing a repetition of the ruthless slaughter indulged in at the first discovery of the islands, when at the right moment the government stepped in and claimed control, just in time to save a very valuable industry from extinction. The condition of affairs on the islands and their capabilities of producing seals were carefully investigated, and in due time a bill was passed by Congress declaring the islands a Treasury reservation, and authorizing their lease to the highest bidder under certain conditions. After much wrangling the lease was finally awarded to the Alaska Commercial Company, incorporated in San Francisco and composed chiefly of residents of the Western metropolis. The company was permitted to kill one hundred thousand seals per annum on payment of a tax of $2.38 for each skin and a rental of $55,000 for the islands and government buildings thereon. The sealing was to be done under the supervision of special agents of the Treasury, who had also full charge of the native laborers on the islands. The company was also bound by the contract to erect and keep in repair comfortable quarters for the laborers; to provide them, free of charge, with the necessary fuel in the shape of wood or coal; to furnish a certain quantity of dried or salted salmon annually, also free of charge; to maintain a school for them under the supervision of the government agent; and to employ the able-bodied men and youths in killing seals and curing the skins at a rate of not less than forty cents per seal.

Knowing that every movement of the holders of so valuable a monopoly would be watched with suspicion, the company lost no time in carrying out to the letter what the contract demanded, and in an incredibly short time the native laborers found themselves transplanted from a position of abject misery into what must to them have appeared as affluence. They were removed from damp underground dwellings (at first much against their will) into comfortable frame cottages with necessary outhouses, and furnished with stoves. At the end of the first season they found themselves in possession of more cash on hand than they had been able to gather during the excitement and high prices of the first rush to the islands, because they had fewer opportunities for foolish expenditure or dissipation.

During the first few years of the present contract the most persistent efforts were made by unsuccessful bidders for the same to create dissatisfaction among the sealers and incite them to complaints against the company. Many of the natives, who looked back with longing upon their brief seasons of wild dissipation, were only too willing to enter into such a movement, and the result was constant agitation, petitions with partially-forged signatures, and finally a series of tedious and expensive Congressional investigations that served only to acquit the company on all charges preferred.

At present the condition of affairs on the two islands of St. Paul and St. George is this: The people, consisting of about one hundred families, perform the labor of killing the animals and skinning them, for which they receive compensation at the rate of forty cents a seal, or forty thousand dollars on the annual quota. The division of the labor and distribution of the proceeds are left entirely in their own hands, and managed by two chiefs of their own selection. In order to provide for all residing on the islands, they have divided their whole number into three classes of shareholders in the common revenue. Able-bodied men and skilled sealers receive a first-class share; youths and feeble men still at work, a second-class share, or about seventy-five per cent. of the former; and widows without children, orphans, and sick people, a third-class share, or fifty per cent. Shares are also provided for the church, the school, the priest's family, and extra compensation for the chiefs who manage the affairs of the community. At public meetings held before the final division other special awards are sometimes made by common consent. As the season of general labor is only about six weeks, the Aleuts on the islands do not wait long for their returns. At the end of the month of August each head of a family or first-class sealer receives between three and four hundred dollars in cash, without being under any expense for lodging, fuel, and nearly all his food. Under such circumstances the prudent among them have, of course, saved money, and but few have succeeded in getting rid of all by gambling. They have now large deposits in San Francisco banks and in the hands of the government agents on the islands, and every year a number of the young men go off on visits to their kin at Oonalashka and other islands, generally returning with a wife selected from the less affluent families of sea-otter hunters. The only complaint heard among them is of the total prohibition of intoxicating drink, now rigidly enforced on both islands.

The habits of the seal have been observed and studied to such perfection that everything that could possibly alarm them or interfere with their comfort or customs is most carefully avoided. The officers and employés have even been deprived of the luxury of fresh milk and beef, because the presence of cattle seemed to alarm the timid animals. During the sojourn of the sleek-coated millions on the islands they are lords of the soil who can indulge their every whim, while man is of only secondary importance, and must give up any comfort that might interfere with that of the much-prized visitors; and as long as this prudent management is continued and rigidly enforced by the Treasury agents, the government of this country will be sure to receive from this small fraction of an immense territory an annual revenue but one-sixth of which is required for the maintenance of the whole.

The shareholders of the old Russian American Company, who so willingly parted with their vast domain, must now look with regret upon the living mine of wealth which bad management and shortsighted policy caused them to relinquish—a "mine" which at the present time pays better than any mineral vein in the great Territory of Alaska.

LAWS IN RELATION TO EXEMPTION, ETC.

CALIFORNIA.

EXEMPTION LAWS.

THE following property is exempt from execution for any debt except it be for the purchase-price of such property or the debt be secured by mortgage, lien, or pledge thereon—to wit: 1st, chairs, tables, desks, and books to the value of two hundred dollars; 2d, necessary household, table, and kitchen furniture of the debtor, including one sewing-machine, stoves, stovepipes, and stove-furniture, wearing apparel, beds, bedding, bedsteads, hanging pictures, oil paintings, and drawings drawn or painted by any member of the family, family portraits and their necessary frames, provisions actually provided for individual or family use sufficient for three months, and three cows and their sucking calves, four hogs with their sucking pigs, and food for such cows and hogs for one month; 3d, the farming utensils, etc. of the judgment debtor, also two oxen or two horses or two mules, and their harness, one cart or wagon, and food for such animals for one month, not exceeding two hundred dollars in value, seventy-five bee-hives, and one horse and vehicle belonging to any person who is maimed or crippled, the same being necessary to his business; 4th, tools or implements of a mechanic or artisan, notary's seal, office-furniture and records, surgeon, physician, music-teacher, surveyor, or dentist's instruments, books, etc., and professional libraries and furniture of attorneys and judges, and libraries of ministers, editors, and school- and music-teachers, and all the indexes, abstracts, books, papers, maps, and office-furniture of searchers of records necessary to be used in their profession; 5th, a miner's cabin, not exceeding five hundred dollars in value, also the sluices, pipes, and tools, etc. necessary for his business, not exceeding five hundred dollars in value, and two horses, mules, or oxen and their harness, and food for the same for one month, when necessary to be used for any windlass, derrick, car, pump, or hoisting-gear, and the miner's derrick, worked by him, not exceeding one thousand dollars in value; 6th, the oxen, horses, or mules, and their harness, and food for one month, and one cart, wagon, dray, truck, coupé, hack, or carriage for one or two horses, by the use of which a cartman, drayman, truckman, huckster, peddler, hackman, teamster, or other laborer habitually earns his living, and one horse, harness, and vehicle used by a physician, surgeon, constable, or minister of the gospel in the legitimate practice of his profession or business, with food for such animal for one month; 7th, poultry worth no more than twenty-five dollars; earnings within thirty days of levy if the defendant swears that they are necessary to support his family residing in the State and supported in whole or in part by his labor, but only half of such earnings are exempt where the debt is for necessaries of life; 9th, the shares in homestead associations, not exceeding in value one thousand dollars, if the debtor has not a homestead selected; nautical instruments and wearing apparel of any master, seaman, or officer of any vessel; 10th, life-insurance policies and all benefits accruing therefrom, provided the annual premium shall not exceed five hundred dollars; 11th, all fire-engines, etc.; 12th, all firearms required by law to be kept by any person, and one gun selected by the debtor; 13th, all court-houses, jails, public offices, buildings, cemeteries, etc. The homestead, consisting of a quantity of land and dwelling-house thereon, not exceeding five thousand dollars in value, selected by the husband and wife, or either, or other head of a family, is also exempt. The homestead of a single person to the extent of one thousand dollars is also exempt.

INTEREST LAW.

Legal interest on a debt after it becomes due and on judgments is seven per cent. per annum. Parties to contract may agree in writing upon a different rate. The rate of interest was changed from ten to seven per cent. February 15, 1878.

RIGHTS OF MARRIED WOMEN.

No estate is allowed the husband as tenant by courtesy, nor is any estate in dower allotted to the wife.

All property, both real and personal, of the wife, owned by her before marriage, and all that she may acquire afterward by gift, bequest, devise, or descent, shall be her separate property, and may be sold, conveyed, or assigned by her without the husband's consent.

All property acquired after marriage by either husband or wife, except such as may be acquired by gift, bequest, devise, or descent, shall be common property. The husband has the entire management, with absolute power of disposition, of the common property; but upon the death of the husband the wife is entitled to one-half of the common property after payment of the debts and expenses of administration. In case of divorce the common property shall be equally divided between the husband and wife, except when the divorce is granted on the ground of adultery or extreme cruelty, in which case the court apportions the property in its discretion. The husband and wife may make contracts and conveyances *inter sese*, subject only to the general rule as to contracts between parties occupying confidential relations.

WASHINGTON TERRITORY.

EXEMPTION LAW.

All real and personal estate belonging to a married woman at the time of her marriage, and all she subsequently becomes entitled to in her own right, and all her personal earnings, and all rents and profits of such real estate, shall not be liable for her husband's debts so long as she or any minor heir of her body is living; but her property is liable for debts owing by her at the time of her marriage. To a householder, being the head of a family, a homestead of the value of one thousand dollars, while occupied by such family, is exempt. But to reserve such property the word "homestead" must be entered in the margin of the record of title in the office of the auditor of said county.

All wearing apparel, private libraries, family pictures, and keepsakes are exempt. To each householder one bed and bedding, and one additional bed and bedding for every two additional members of the family, and other household goods of the coin value of one hundred and fifty dollars; two cows with their calves, five swine, two stands of bees, twenty-five domestic fowls, and provisions and fuel for six months, are exempt; to a farmer, one span of horses and harness, or two yoke of oxen, and one wagon, with farming utensils not exceeding two hundred dollars coin value; to a mechanic, the tools used to carry on his trade for the support of himself and family, also material of the value of five hundred dollars; to a physician, his library, horse and carriage, instruments, and medicines; to attorneys and clergymen, their libraries, not exceeding the coin value of five hundred dollars, also office-furniture, stationery, and fuel; all firearms kept for use, and a canoe, skiff, or small boat not exceeding the coin value of fifty dollars; to a person engaged in lightering, one or more lighters or scows and a small boat, not exceeding the aggregate value of two hundred and fifty dollars; to a drayman, his team; to persons in logging, three yoke of work-oxen and implements of the value of three hundred dollars. No property shall be exempt upon a judgment for its purchase-price or for tax levied thereon.

MARRIED WOMEN.

A married woman may sue and be sued without joining her husband when the action concerns her separate property or her right or claim to the homestead property, when she is living separate and apart from her husband, or when the action is between herself and her husband. If a husband and wife be sued together, she may defend her own right, and his also if he neglects to do so. All property, both real and personal, owned by the wife before marriage, and that acquired afterward by gift, devise, or descent, is her separate property. Property thus acquired by the husband constitutes his separate property. All property acquired during marriage, except by gift, devise, or descent, constitutes their common property.

INTEREST LAW.

The legal rate of interest is ten per cent. per annum; any rate of interest agreed upon in writing shall be valid. Judgments bear legal interest from date except when rendered upon an express contract in writing wherein a different rate is agreed upon, in which case the judgment bears same rate.

MONTANA.

EXEMPTION LAWS.

All clothing of the debtor and family, and chairs, tables, desks, and books to the value of one hundred dollars, also all necessary household, table, and kitchen furniture, which includes every article in use for the comfort of the debtor or his family, and provisions and fuel actually provided for individual or family use sufficient for two months, are exempt; one sewing-machine, not exceeding the value of one hundred dollars, in actual use by the debtor or his family; also one horse, two cows with their calves, two swine, and fifty domestic fowl. In addition to the above there is exempt to a farmer his farming utensils, not exceeding in value six hundred dollars, two oxen or one horse or mule, and their harness, two cows, one cart or wagon, and food for such stock for three months; two hundred dollars' worth of seeds, grain, or vegetables actually provided for the purpose of sowing or planting; the proper tools, instruments, or books of any mechanic, physician, dentist, lawyer, or clergyman; to a miner, his dwelling, not exceeding in value five hundred dollars, and one horse, mule, or two oxen, and their harness, with their food for three months, in case such stock is used necessarily in connection with any species of hoisting-gear upon the mine; one horse, mule, or two oxen, with vehicle and harness, by which the debtor habitually earns his living, and one horse, with vehicle and harness, of a physician or clergyman, used in making professional visits, with food for such stock for three months; all arms, uniforms, etc., required by law to be kept by any person; all property generally held by the town or county for the benefit of the county or the public, except as against a vendor's lien or a mortgage; the wages of the debtor earned at any time within thirty days next preceding the levy, provided they are necessary for the use of his family residing in the Territory, supported wholly or in part by his labor. None but *bonâ fide* residents can claim the benefits of this law. A homestead not to exceed in value twenty-five hundred dollars is exempt; if agricultural land, it is not to exceed one hundred and sixty acres; if within the limits of a town-plot, city, or village, not to exceed one-fourth of an acre. The debtor has his option of the two, and may select either, with all improvements thereon which are included in the valuation. Such exemption does not affect the lien of any mechanic or laborer or extend to any mortgage legally obtained.

INTEREST LAW.

Parties may stipulate for any rate of interest. When no contract is made as to interest, the legal rate, ten per cent. per annum, governs after the debt is due. There is no usury law.

RIGHTS OF MARRIED WOMEN.

The property of a married woman, owned before marriage, and any acquired after marriage by gift, grant, devise, descent, or otherwise, and the use, increase, and profits thereof, are exempt from debts or liabilities of the husband, except for necessaries for the benefit of herself and children under eighteen years of age. But such property so claimed must be set forth in a list to be recorded with the register of deeds in the county where she resides.

By the act of February 4, 1874, a married woman may become a *sole* trader by making, acknowledging, and recording with the county recorder of deeds her intention so to do, and setting forth the nature of the business that she intends to transact. If the amount of her investment in business exceeds ten thousand dollars, the declaration must contain a statement under oath that the surplus above ten thousand dollars did not come from any funds belonging to her husband. Such married woman is responsible for the maintenance of her children. The husband is not liable for any debts contracted in the course of business done by his wife, except by special consent in writing.

KANSAS.

EXEMPTION LAWS.

The constitution provides that a homestead to the extent of one hundred and sixty acres of farming land, or of one acre within the limits of an incorporated town or city occupied as a residence by the family of the owner, together with all the improvements upon the same, shall be exempted from forced sale under the process of law, and shall not be alienated without a joint consent of husband and wife when the relation exists; but no property shall be exempt from sale for taxes or for the payment of obligations contracted for the purchase of said premises or for the erection of improvements thereon. But this does not apply where a lien is given by consent of husband and wife. By statute each resident, being the head of a family, is entitled to have exempt from seizure and sale upon any judicial process the family books and musical instruments, a seat or pew in church and lot in burial-ground, all wearing apparel, bedsteads, bedding, stove, and cooking-utensils used by the family, one sewing-machine, all implements of industry, five hundred dollars' worth of other household furniture, two cows, ten hogs, one yoke of oxen, and one horse or mule (or in lieu of one yoke of oxen and one horse or mule a span of horses or mules), twenty sheep and the wool from the same, the necessary food for the stock above described for one year, either provided or growing, one wagon, cart, or dray, two ploughs, one drag, and other farming utensils, including harness and tackle and harness for teams, not exceeding in value three hundred dollars, provisions for the support and use of the family for one year, the necessary tools and implements of any mechanic, miner, or other person, used and kept for the purpose of carrying on his trade or business, and in addition thereto stock in trade not exceeding four hundred dollars in value; and the library, implements, and office-furniture of any professional man. A resident, not being the head of a family, has exempt his wearing apparel, church-pew, burial-lot, necessary tools and implements used in his trade or business, stock in trade not exceeding four hundred dollars, and, if a professional man, his library, implements, and office-furniture.

INTEREST LAWS.

Creditors shall be allowed to receive interest at the rate of seven per cent. per annum, when no other rate of interest is agreed upon, for all moneys after they become due; for money lent or money due on settlement of account, from the day of liquidating the same and ascertaining the balance; for money received for the use of another and retained without the owner's knowledge of the receipt; for money due and withheld by an unreasonable and vexatious delay of payment or settlement of accounts; and for all other money due or to become due for the forbearance of payment whereof an express promise to pay interest has been made. The parties to any bond, bill, promissory note, or other instrument of writing for the payment or forbearance of money may stipulate therein for interest receivable upon the amount of such bond, bill, note, or other instrument of writing; provided, that no person shall recover in any court more than twelve per cent. interest thereon per annum. All payments of money or property made by way of usurious interest or of inducement to contract for more than twelve per cent. per annum, whether made in advance or not, shall be deemed and taken to be payments made on account of the principal and twelve per cent. interest per annum, and the courts shall render judgment for no greater sum than the balance found due after deducting the payments of money or property made as aforesaid.

MARRIED WOMEN.

The property, real and personal, which any woman in this State may own at the time of her marriage, and the rents, issues, and profits or proceeds thereof, and any real, personal, or mixed property which shall come to her by descent, devise, or bequest, or the gift of any person except her husband, shall remain her sole and separate property, notwithstanding her marriage, and not be subject to the disposal of her husband or liable for his debts.

A married woman, while the marriage relation subsists, may bargain, sell, and convey her real and personal property, and enter into any contract with reference to the same, in the same manner and to the same extent and with like effect as a married man may in relation to his real and personal property. A woman may while married sue and be sued in the same manner as if she were unmarried.

Any married woman may carry on any trade or business and perform any labor or service on her sole and separate account; and the earnings of any married woman from her trade, business, labor, or services shall be her sole and separate property, and may be used and invested by her in her own name.

Any woman who shall have been married out of this State shall, if her husband afterward becomes a resident of this State, enjoy all the rights as to property which she may have acquired by the laws of any other State, Territory, or country, or which she may have acquired by virtue of any marriage contract or settlement made out of this State.

WYOMING.

EXEMPTION LAWS.

Every householder, being the head of a family, is entitled to a homestead not exceeding in value fifteen hundred dollars, exempt from execution or attachment for any debt, contract, or civil obligation, while such homestead is actually occupied as such by the owner thereof or his or her family. The homestead may consist of a house and lot or lots in any town or city, or a farm of not more than one hundred and sixty acres. The owner of a homestead may mortgage the same, but such mortgage shall not be binding against the wife of a married man who may be occupying the premises with him unless she shall freely and voluntarily acknowledge and sign the same, and the officer taking such acknowledgment shall fully apprise her of her rights and of the effect of signing such mortgage. Besides the homestead above mentioned, the wearing apparel of every person is exempt from judicial or ministerial process; also the following property when owned by any person being the head of a family and residing with the same—to wit: the family Bible, pictures, and school-books, a lot in any cemetery or burial-ground, furniture, bedding, provisions, and such other articles as the debtor may select, not exceeding in value in all five hundred dollars, to be ascertained by the appraisement of three disinterested householders; provided that no personal property of any person about to remove or abscond from the Territory shall be exempt. The tools, team, and implements or stock in trade of a mechanic, miner, or other person, and used and kept for the purpose of carrying on his trade or business, are exempt to a value not exceeding three hundred dollars; also the library, instruments, or implements of any professional man, not exceeding in value three hundred dollars. The person claiming exemption must in all cases be *bonâ fide* a resident of the Territory.

INTEREST LAWS.

Any rate may be agreed upon in writing, but in the absence of express contract all moneys, claims, or judgments draw interest at the rate of twelve per cent. per annum; unsettled accounts draw interest after thirty days from the date of the last item.

MARRIED WOMEN.

The rights of a married woman in this Territory are very nearly the same as those of an unmarried woman as respects her property, both real and personal. She may make a will, sue and be sued, make contracts, carry on a trade or business, retain her own earnings, and hold property real or personal, with the rents and profits of the same, in her own name, free from the control or interference of her husband, the same as though she were *sole* and unmarried. And her property is exempt from execution or attachment for the debt of her husband. She has also all the rights of an elector, and may hold office and vote at all elections in the same manner as other electors. She may not, however, be appointed administratrix or hold that trust after marriage.

IDAHO.

EXEMPTION LAWS.

The following property is exempt from execution: 1st, chairs, tables, desks, and books to the value of one hundred dollars, belonging to judgment debtors; 2d, necessary household, table, and kitchen furniture, including stove, stovepipe, and stove-furniture of whatsoever kind, wearing apparel, beds, bedding, and bedsteads, and provisions actually provided for individual or family use sufficient for three months; 3d, the farming utensils or implements of husbandry of the judgment debtor; also two oxen or two horses or two mules, and their harness, two cows, one cart or wagon, and also food for such oxen, horses, cows, or mules for three months; also all seed-grain or vegetables actually provided, reserved, or on hand for the purpose of planting or sowing at any time within the ensuing six months, not exceeding in value the sum of two hundred dollars; the tools and implements of a mechanic necessary to carry on his trade; the instruments and chests of a surgeon, physician, surveyor, or dentist, necessary to the exercise of his profession, with his professional library and the law library of an attorney and counsellor; also the wardrobe and books of an actor; 4th, the tents and furniture, including a table, camp-stool, bed, and bedding, of a miner; also his rocker, shovels, spades, wheelbarrows, pumps, and other instruments used in mining, with provisions necessary for his support for three months; 5th, two oxen, two horses, or two mules, and their harness, and one cart or wagon, by the use of which a cartman, teamster, or other laborer habitually earns his living, and the food for such oxen, horses, or mules for three months; and a horse used by a physician in making his professional visits; 6th, the fire-engines, with the carts, buckets, hose, and apparatus thereto appertaining, of any fire company or department organized under any law of this Territory; 7th, all arms and accoutrements required by law to be kept by any person. But no article mentioned in this section shall be exempt from execution issued upon a judgment recovered for its price or upon a mortgage thereon. All court-houses, jails, public offices, and building-lots, ground and personal property, fixtures and furniture, books, paper, and appurtenances, belonging and appertaining to the court-house, jail, and public offices belonging to any county of this Territory, and all cemeteries and public squares, parks, and places, public buildings, town-halls, markets, buildings appertaining to the fire departments, and the lots and ground thereto belonging and appertaining, owned or held by any town or incorporated city, or dedicated by such town or city to health, ornament, or public use, are exempt. A homestead duly selected by husband and wife, or either, or by the head of a family, and duly acknowledged and recorded, not exceeding in value five thousand dollars, is exempt.

INTEREST LAWS.

Ten per cent. is the legal rate where there is no express contract fixing a different rate. Parties may agree in writing for any rate not exceeding one and one-half per cent. per month, but any judgment rendered upon such contract bears only ten per cent. per annum. Penalty for greater rate than above specified is three times the amount so paid, and the party receiving a greater sum subjects himself to a penalty of three hundred dollars or six months' imprisonment, or both. Interest does not commence to run on open accounts until a balance is struck and agreed to, or settlement is had.

MARRIED WOMEN.

All property, both real and personal, of the wife before marriage, and that acquired afterward by gift, bequest, devise, or descent, is her separate property, and all the husband's his separate property. All other property acquired after marriage is common property. The wife is required to make, sign, and have recorded a complete inventory of her separate property in the office of the recorder of the county where the property is situated. The husband has the management and control of the wife's separate property during marriage, but cannot alienate nor create a lien nor incumbrance on the same except by instruments signed and acknowledged by both husband and wife.

The district courts may on application of the wife appoint trustees to take charge of and manage her separate property if the husband mismanages or commits waste.

The husband has entire management and control of the common property and his own separate property, and the rents and profits of all separate property of both husband and wife are deemed common property, unless it is expressly provided in the instrument of devise to the contrary. Upon dissolution of the community by death, half of the common property goes to the survivor and half to the descendants if there are any; if not, all to the survivor. Upon dissolution by decree of court, the common property must be equally divided, unless the decree is granted upon the ground of adultery or extreme cruelty, when the division of the same is left within the discretion of the court granting the decree.

The separate property of the husband is not liable for the debts of the wife contracted before marriage, but the separate property of the wife is liable for all such debts. She may by contract make herself liable so as to charge her separate property.

NEW MEXICO.

EXEMPTION LAWS.

Real estate to the value of one thousand dollars shall be exempt from execution in favor of heads of families, actually residing on the same, provided the exemption be claimed. But if, in the opinion of the creditors, the premises claimed as exempt are worth more than one thousand dollars, it shall be lawful for the officer to advertise and sell the premises, and out of the proceeds of such sale pay to the execution debtor one thousand dollars, which shall be exempt from execution for one year thereafter, and apply the balance to the payment of the execution; provided that no sale can be made unless more than one thousand dollars be bid for the premises. There are also exempt the clothing, beds, and bed-clothing necessary for the use of the family, and firewood sufficient for thirty days when actually provided and intended therefor; all Bibles, hymn-books, Testaments, school-books used by the family, and family and religious pictures; provisions actually provided to the amount of twenty-five dollars, and kitchen furniture to the amount of ten dollars, both to be selected by the debtor; also all tools and implements belonging to the debtor that may be necessary to enable him to carry on his trade or business, whether agricultural or mechanical, to be selected by him, and not to exceed twenty dollars in value. Real estate, when sold, must be first appraised by two freeholders of the vicinity, and must bring two-thirds of the appraised value.

INTEREST LAW.

The rate of interest is any amount that may be agreed upon by the parties; but where none is expressed, then the law allows six per cent. per annum. All open running accounts bear six per cent. from six months after date of the last item. Judgments bear the same rate of interest as the obligation or agreement sued on, when expressed in the judgment; otherwise, six per cent. Prior to January 31, 1872, twelve per cent. was the highest rate of interest allowed by law.

MARRIED WOMEN.

Married women are the sole owners of the property they inherit or bring into the marriage community, but can convey their real estate only by joining in a deed with their husbands. The husband has the control and management of the wife's property, and the proceeds become their joint property. The wife has no dower whatever except her private property, which is the first deduction from an estate, and has precedence over all other creditors as an implied privileged mortgage. After paying off all the debts, the remainder of the property is divided equally between the husband's estate and his wife, this being called the "acquest property," and under the laws belongs to the two, the relation of the husband and wife to each other with reference to property being almost identical with that of equal partners. After giving to the wife one-half aforesaid, the remainder is divided by giving to the wife one-fourth thereof, first deducting sufficient to pay off any legacies. The wife becomes heir to all the acquest property if the husband dies without issue. A wife's separate property is not liable for debts contracted by her as agent for her husband for the support of herself and children, nor for the expenses of the family in any case.

OREGON.

EXEMPTION LAWS.

The following property shall be exempt from execution if selected and reserved by the judgment debtor or his agent at the time of the levy, or as soon thereafter, before the sale thereof, as the same shall be known to him, and not otherwise: Books, pictures, and musical instruments, owned by any person, to the value of seventy-five dollars; necessary wearing apparel, owned by any person, to the value of one hundred dollars, and if such person be a householder for each member of his family to the value of fifty dollars; the tools, implements, apparatus, team, vehicle, harness, or library necessary to enable any person to carry on the trade, occupation, or profession by which such person habitually earns his living, to the value of four hundred dollars; also a sufficient quantity of food to support such team, if any, for sixty days. The word "team" in this subdivision shall not be construed to include more than one yoke of oxen or pair of horses or mules, as the case may be.

The following property, if owned by a householder, in actual use or kept for use by and for his family, or when being removed from one habitation to another on a change of residence: Ten sheep, with one year's fleece or the yarn or cloth manufactured therefrom; two cows and five swine; household goods, furniture, and utensils to the value of three hundred dollars; also food sufficient to support such animals, if any, for three months, and provisions actually provided for family use and necessary for the support of such householder and family for six months; the seat or pew occupied by a householder or his family in a place of public worship; all property of the State or any county, incorporated city, town, or village therein, or any other public or municipal corporation of like character. No article of property, or if the same has been sold or exchanged, then neither the proceeds of such sale nor the article received in exchange therefor, shall be exempt from execution issued on a judgment recovered for its price. Every white male citizen of this State above the age of sixteen years shall be entitled to have and keep for his own use and defence the following firearms—to wit: either or any of the following-named guns and one revolving pistol: a rifle, shot-gun, double- or single-barrel, yager, or musket; the same to be exempt from execution in all cases under the laws of Oregon.

INTEREST LAW.

When no rate is agreed upon, ten per cent. is allowed, but parties may lawfully agree upon twelve per cent.

Usury is punished by forfeiture of the original sum lent to the common-school fund, and costs of action or suit are adjudged against the person seeking to enforce the usurious contract.

Judgments and decrees for money upon contracts bearing more than ten per cent. interest, and not exceeding twelve per cent. per annum, bear the same interest as that stipulated in the contract. Upon accounts interest is only allowed from their maturity, and then only from the time when the balance is ascertained.

MARRIED WOMEN.

The property and pecuniary rights of every married woman at the time of her marriage, or afterward acquired by gift, devise, or inheritance, shall not be subject to the debts and contracts of her husband, and she may manage, sell, convey, or devise the same by will to the same extent and in the same manner that the husband can do with property belonging to him. When property is owned by either the husband or wife, the other has no interest therein which can be the subject of contract between them, or such interest as will make the same liable for the contracts or liabilities of either the husband or wife who is not the owner of the property. Should either the husband or wife obtain possession or control of property belonging to the other, either before or after marriage, the owner of the property may maintain an action therefor, or for any right growing out of the same, in the same manner and extent as if they were unmarried.

A married woman is alone responsible in damages for injuries committed by her, except in case where her husband would be responsible with her if marriage did not exist.

A conveyance, transfer, or lien executed by either husband or wife, or in favor of the other, shall be valid to the same extent as between other persons.

He or she may constitute the other his or her attorney in fact to dispose of his or her property, and may revoke the same in the same manner and to the same extent as other persons.

A wife may receive the wages of her labor, and bring action therefor in her own name, and she may prosecute and defend all actions at law or in equity for the preservation and protection of her rights and property.

Neither the husband nor wife is liable for the debts or liabilities of the other incurred before marriage. Either is not liable for the separate debts of the other. Contracts may be made by a wife, and the same enforced by or against her in the same manner as if she was unmarried.

The expense of the family and the education of the children are chargeable upon the property of both husband and wife, or either of them, and in relation thereto they may be sued jointly or separately.

A married woman may contract expressly in reference to her separate estate, and such separate estate is liable to execution and sale for liabilities so contracted. Any express contract of a married woman made a charge upon her separate estate is binding, and she may be sued alone upon it; and a judgment rendered thereupon may be enforced against the separate property charged.

Women become of age at eighteen or at their marriage.

NEVADA.

EXEMPTION LAW.

The following property is exempt from execution except upon a judgment for the purchase-money or upon a mortgage thereon: Chairs, tables, desks, and books to the value of one hundred dollars; household furniture, etc.; provisions and firewood for one month; farming utensils of a farmer, and seed provided for planting within the ensuing six months, not exceeding in value two hundred dollars; two horses, two oxen, or two mules, and two cows, and food for one month for such animals; one cart or wagon, and tools of a mechanic necessary to his trade; the instruments and libraries necessary to a surgeon, physician, surveyor, or dentist; the professional library of an attorney and counsellor or minister of the gospel; the dwelling of a miner, not exceeding in value five hundred dollars, and two horses, two oxen, or two mules, the harness and food for one month for such animals when they are necessary in his mining operations; two oxen, two horses, or two mules, and their harness, and one cart or wagon, by the use of which a teamster or other laborer habitually earns his living; one horse, harness, and vehicle of a physician or surgeon or minister of the gospel, and food for such animal for one month; one sewing-machine in actual use in the debtor's family, not exceeding in value one hundred and fifty dollars; all fire-engines and property of fire companies; all arms, etc. required by law to be kept by any person; all public property of State, counties, towns, etc.;

a homestead, to be selected by the husband and wife or other head of a family, not exceeding in value five thousand dollars.

A homestead duly recorded cannot be alienated except by the consent of both husband and wife (where that relation exists), which consent must be in writing and duly acknowledged and recorded. The joint deed or conveyance has the same effect.

INTEREST LAW.

Ten per cent. per annum is legal interest, but parties may contract in writing for the payment of any other rate. After judgment on such a contract only the original claim shall draw interest.

MARRIED WOMEN.

All property of the wife owned by her before marriage, and that acquired afterward by gift, bequest, devise, or descent, shall be her separate property. All property acquired after marriage by either husband or wife, except such as may be acquired by gift, devise, or descent, shall be common property.

The husband has absolute control of the common property during the existence of the marriage, and may dispose of it as his own separate estate. The wife may, without consent of her husband, convey, charge, incumber, or otherwise in any manner dispose of her separate property.

A woman becomes of age at eighteen.

The wife must support the husband out of her separate property when he has no separate property and they have no community property, and he from infirmity is not able or competent to support himself.

The husband can have no estate by courtesy, nor the wife any estate by dower. Upon the death of the husband one-half of the common property, after paying the debts, family allowance, and expenses of administration, shall go to the surviving wife. In case of a divorce the common property shall be equally divided between the parties, except when granted upon the ground of adultery or extreme cruelty, in which case the court may divide it as shall seem just.

After marriage the separate property of the wife shall continue liable for her debts contracted before marriage.

A married woman may make contracts in her own name, buy goods, give notes in settlement of purchases, binding her own separate property, real and personal.

NEBRASKA.

EXEMPTION LAW.

There is exempt from judicial sale to every family, whether owned by the husband or wife, a homestead, which, if within a town-plot, must not exceed one-half an acre in extent, and if not within a town-plot must not in the aggregate exceed one hundred and sixty acres; but if, when thus limited in either case, its value is less than five hundred dollars, it may be enlarged until its value reaches that amount; provided that a homestead shall in no event exceed in value the sum of two thousand dollars. In case the debtor has no lands there are exempt from execution five hundred dollars in personal property. The clothing of the family, family supplies for six months, supplies for domestic animals for three months, furniture, family Bible, and picture-books, cooking utensils, certain domestic animals, tools, implements of trade, etc., are exempt; also, sixty days' wages to any laboring man, clerk, etc.; provided that there is no exemption from attachment or execution for wages due to any clerk, laborer, or mechanic, or for money due and owing by any attorney-at-law for money or other valuable consideration received by such attorney for any person or persons. A conveyance or incumbrance by the owner is of no validity unless the husband and wife, if the owner is married, concur in and sign the same joint instrument.

The homestead may be sold for debts created by written contracts executed by the persons having the power to convey, and expressly stipulating that the homestead is liable therefor; but it shall not in such case be sold except to supply the deficiency remaining after exhausting the other property pledged for the payment of the debt in the same written contract.

INTEREST LAW.

The legal rate of interest has been made seven per cent., but by agreement may be as high as ten per cent. Judgments draw as high a rate of interest as the contracts upon which they are founded. The acts and dealings of an agent in loaning money shall bind the principal; and in all cases when there is illegal interest by the transaction of the agent, the principal will be held thereby as if he had done the same in person. Where the same person acts as agent for the borrower who obtains the money for the lender, he shall be deemed to be the agent of the loaner also. Any person charged with taking illegal interest may be required to answer touching the same on oath in any civil proceeding.

Any officer or agent of a corporation or person, whether interested or not, may be summoned as a witness in any action for usury against such person or corporation, and required to disclose all the facts of the case; but the testimony of such witness or the answer of the party as required shall not be used against such witness or party in any criminal prosecution for perjury.

The penalty for usury is to prevent the recovery of any interest on the principal or of any costs in the action. The principal can be recovered.

MARRIED WOMEN.

The property, real or personal, owned by married women at the time of the marriage, the rents, issues, profits, and proceeds thereof, and any property which comes to her except only by gift of her husband, remains her sole and separate property, not subject to the disposal of her husband nor liable for his debts. She may convey her real estate and contract with reference thereto in the same manner and with like effect as a married man, and may sue and be sued as if unmarried; may labor or carry on business on her separate account, and her earnings are her sole property. If married out of the State, she may here enjoy all rights as to the property there acquired. The husband is not liable for debts contracted by the wife before marriage.

Any will of a married woman conveying real property, or any revocation or alteration thereof, is not valid without the consent of the husband in writing annexed thereto, attached, subscribed, witnessed, proven, and recorded. A married woman is personally liable for her contracts made in her own name, and her separate property can be made to satisfy the same.

The property of a married woman, without act of hers, is not liable for her husband's debts.

Males become of age at twenty-one, females at eighteen, but in case a female marries between the ages of sixteen and eighteen her minority ends.

COLORADO.

EXEMPTION LAWS.

Besides a homestead of the value of two thousand dollars, there are exempt from execution and attachment various articles of personal property when owned by any one who is the head of a family and resides with the same, varying in quantity and value according to the size and wants of such family, and of such kind as is usually exempted by statute —viz. household furniture not exceeding one hundred dollars; provisions for debtor and his family for six months; tools, implements, or stock in trade not exceeding two hundred dollars; library and implements of any professional man not exceeding three hundred dollars; working animals to the value of two hundred dollars; one cow and calf, ten sheep, and necessary food therefor for six months; farm-wagon, cart, or dray; one plough, one harrow, and other farm-implements, including harness and tackle for team, not exceeding fifty dollars.

MARRIED WOMEN.

A married woman may transact business the same as if *sole;* may dispose of her personal and real estate, or make any contract in relation to the same, without her husband's consent, and may sue and be sued as if *sole*, and may convey her real estate without her husband joining in the deed with her; and her acknowledgment to such deed may be taken in the same manner as her husband's. Execution may issue against her property on judgment obtained against her.

Her separate property, acquired by her or left to her by will before or after marriage, is not bound for her husband's debts. She can make contracts in her own name, buy goods, give notes in settlement of purchases —can do any business the same as if *sole*, and bind her own separate property, real and personal.

In all actions against her, except concerning her own property, her husband must be joined with her as co-defendant.

INTEREST LAW.

The legal rate of interest is ten per cent. per annum, and can be recovered by suit on money lent; on money due on the settlement of account, from the day of liquidating accounts between the parties and ascertaining the balance due; also on money received to the use of another and retained without the owner's knowledge, and on money withheld by an unreasonable and vexatious delay; also on judgments and county orders after presenting and registering, State warrants after registering, eight per cent. per annum. There are no usury laws. Any rate agreed upon is legal.

DAKOTA.

EXEMPTION LAWS.

The following property is absolutely exempt from attachment or mesne process, and from levy and sale on execution, and from any other final process issued from any court: All family pictures; a pew or other sitting in any house of worship; a lot or lots in any burial-ground; the family Bible and all school-books used by the family, and all other books used as a part of the family library, not exceeding in value one hundred dollars; all wearing apparel and clothing of the debtor and his family; the provisions for the debtor and his family necessary for one year's supply, either provided or growing, or both, and fuel necessary for one year; the homestead as created, defined, and limited by law. In addition to the above-mentioned property, the debtor may by himself or his agent select from all other of his personal property not absolutely exempt goods, chattels, merchandise, money, or other personal property not to exceed in the aggregate fifteen hundred dollars in value, which is also exempt. Instead of the fifteen hundred dollars' exemption, the debtor may select and choose the following property, which shall then be exempt, namely: all miscellaneous books and musical instruments for the use of the family, not exceeding five hundred dollars in value; all household and kitchen furniture, including beds, bedsteads, and bedding used by the debtor and his family, not exceeding five hundred dollars in value; and in case the debtor shall own more than five hundred dollars' worth of such property, he must select therefrom such articles to the value of five hundred dollars, leaving the remainder subject to legal process; three cows, ten swine, one yoke of cattle, and two horses or mules or two yoke of cattle or two span of horses or mules, one hundred sheep and their lambs under six months old, and all wool of the same, and all cloth or yarn manufactured therefrom; the necessary food for the animals hereinbefore mentioned for one year, either provided or growing, or both, as the debtor may choose; also one wagon, one sleigh, two ploughs, one harrow, and farming utensils, including tackle for teams, not exceeding three hundred dollars in value; the tools and implements of any mechanic, whether a minor or of age, used and kept for the purpose of carrying on his trade or business; and in addition thereto stock in trade not exceeding two hundred dollars in value; the library and instruments of any professional person, not exceeding six hundred dollars in value.

No property is exempt except that absolutely exempt from execution for laborers' or mechanics' wages. Except those made absolute, the exemptions do not apply to a corporation for profit, to a non-resident, to a debtor who is with his family removing from the Territory or who has absconded, taking with him his family.

A partnership firm can claim but one exemption of fifteen hundred dollars in value of the alternate property, where so applicable instead thereof, out of the partnership property, and not a several exemption for each partner.

The homestead of every family resident in this Territory, whether owned by the husband or wife, so long as it remains a homestead, is absolutely exempt except for taxes, mechanics' liens for work, labor, or materials done or furnished exclusively for the improvement of the same, and debts created for the purchase thereof. If within a town-plot, it must not exceed one acre in extent, and if not in a town-plot, it must not embrace in the aggregate more than one hundred and sixty acres, with the house and buildings appurtenant thereon, and is without limitation in value. Such exemption continues after the debtor's death for the benefit of the surviving husband or wife and children, and, if both husband and wife be dead, till the youngest child comes of age.

RATE OF INTEREST.

The legal rate of interest is seven per cent. Parties may contract for a higher rate, not to exceed twelve per cent. A person taking, receiving, retaining, or contracting for any higher rate of interest than at the rate of twelve per cent. shall forfeit all the interest so taken, received, retained, or contracted for. Interest on open accounts commences from the time of last item charged, either debit or credit. Interest is payable on judgments recovered in the courts of this Territory at the rate of seven per cent. per annum.

RIGHTS OF MARRIED WOMEN.

A married woman may own in her own right real and personal property acquired by descent, gift, or purchase, and manage, sell, convey, and devise the same to the same extent and in the same manner as if she was unmarried. Contracts may be made by a married woman, and liabilities incurred, and the same enforced by or against her, to the same extent and in the same manner as if unmarried. Neither husband nor wife has any interest in the property of the other, but neither can be excluded from the other's dwelling. Either husband or wife may enter into any engagement or transaction with the other or with any other person respecting property which either might enter into if unmarried, subject in transactions between themselves to the general rules which control the actions of persons occupying confidential relations with each other, as defined by the law of trusts.

A husband and wife may hold real or personal property together, jointly or in common.

Neither husband nor wife, as such, is answerable for the acts of the other.

The earnings of the wife are not liable for debts of the husband, and the earnings and accumulations of the wife and of her minor children living with her or in her custody, while she is living separate from her husband, are the separate property of the wife.

The separate property of the husband is not liable for the debts of the wife contracted before the marriage. The separate property of the wife is not liable for the debts of her husband, but is liable for her own debts contracted before or after marriage.

A wife's separate property is not liable for debts contracted for the support of herself, her children, or the family, as her husband's agent.

A married woman may buy and sell goods, give notes, or other obligations, and sue and be sued, the same as if unmarried.

GOVERNMENT LANDS, AND HOW TO GET THEM.

Soldiers' and Sailors' Homesteads.—By various amendments to the Homestead Act in favor of the soldiers and sailors of the late war, it is provided as follows:

1. Every soldier and officer of the army, and every seaman, marine, and officer of the navy, who served not less than ninety days in the army or navy of the United States "during the recent rebellion," and who was honorably discharged and who has since remained loyal, is entitled to enter one hundred and sixty acres of land either outside or *inside the limits of railroad grants.* 2. The time of service in the army or navy, or the whole term of enlistment if discharged on account of wounds or disability, shall be deducted from the five years' residence heretofore required to perfect title; *provided,* that each homestead settler shall reside upon, improve, and cultivate his homestead for a period of at least one year immediately after he shall commence his improvements. 3. The unmarried widow or the orphan children of a person who, if living, would be entitled to the privileges of this act, may enter lands under its provisions; and if the person died during his term of enlistment the widow or minor children shall have the benefit of the whole term of such enlistment. 4. *Any person entitled to the benefits of this act may file his claim for a homestead at the local land-office nearest such homestead through an agent (without being present in person), and shall have six months thereafter within which to make his entry and commence his settlement and improvement upon the land.* The agent must have a duly-executed power of attorney from the person for whom he acts.

Homesteads.—1. Under the Homestead Law the right is extended to every citizen, *and to those who have declared their intention to become such,* to enter one hundred and sixty acres of land, either inside or outside the limits of railroad grants.

2. Actual settlement and cultivation for a continuous period of five years, together with the payment to the United States Land Receiver of the fees allowed by law, are the basis of a patent or complete title for the homestead.

3. The widow or heirs of the settler, in case of his death before the consummation of the claim, may continue settlement or cultivation, and obtain title upon making requisite proof.

4. Proof of settlement or cultivation must be made at the expiration of the period of five years, or within two years thereafter.

Adjoining farm homesteads may be entered by an applicant owning an original farm contiguous thereto, when such adjoining farm with the original farm shall not exceed in the aggregate one hundred and sixty acres.

Actual residence on the separate tract need not be proved, but it must appear that the settler has resided upon and cultivated the original tract for the period required by law, making use of the entered tract as a part of the homestead.

No fees or commissions are required for this class of entries.

Pre-emption.—Under the Pre-emption Law, persons entitled to the privileges of the Homestead Law may acquire the right to *purchase* one hundred and sixty acres of government land, whether within railroad limits or not, by filing a declaration that he or she has settled upon and claims the same. Within railroad limits the government price is two dollars and fifty cents per acre; outside of such limits, one dollar and twenty-five cents; the entire amount may be paid at the end of six months' residence, or within thirty-three months. Pre-emptors are required to remain upon and improve the lands for six months. Taking lands under the Pre-emption Law does not prevent entry under the Homestead Law afterward. The same person may enjoy all the privileges of both laws. A homestead entry may be changed to a pre-emption claim or may be commuted after six months' residence.

The Timber-Culture Act.—Under the provisions of this act any citizen of the United States, *or those who have declared their intention to become such,* can make an entry of not to exceed one hundred and sixty acres, either within or without the limits of a railroad grant, on condition that one-sixteenth of the land so taken shall be planted with trees, cultivated, and protected for eight years, when final proof can be made and patent secured.

Under the operation of these laws any settler can secure from two hundred and forty to three hundred and twenty acres of land at a most trifling cost.

MISCELLANEOUS INFORMATION FOR TRAVELLERS.

[Credit is here accorded to Williams's *Pacific Tourist* for much valuable information.]

HINTS FOR THE TRIP OVERLAND.

Baggage.—All baggage of reasonable weight can be checked from any Eastern city direct to Omaha, but is there rechecked. At Omaha all baggage is weighed, and on all excess of over one hundred pounds passengers will pay fifteen cents per pound. This is imperative.

Railroad Tickets are easily procured for the whole trip across to San Francisco. It is better to buy one through-ticket than to buy separately. By returning on a different route from Omaha than the one you went, the tour will be much more interesting and give you fresh scenery constantly. Buy your tickets only at known railroad-offices, and never of agencies. In the West railroads have offices at the principal hotels. These are usually perfectly reliable.

To Check Baggage, be at every dépôt one half hour or more before the departure of trains.

Transfer-Coaches.—In all Western cities there is a line of transfer-coaches, which for the uniform price of fifty cents will take you and your baggage direct to any hotel or transfer you at once across the city to any dépôt. They are trustworthy, cheap, and convenient. The agent will always pass through the train before arrival, selling transfer-tickets and checks to hotels. At Salt Lake City horse-cars run from the dépôt direct to the hotels; there is also an omnibus transfer. Price, fifty cents.

Without many exceptions, all railroad-officers, railroad-conductors, and Pullman car-conductors are gentlemen in manners, courteous, and civil. No passenger ever gains a point by loud orders or strong and forcible demands. You are treated respectfully by all, and the same is expected in return. The days of boisterous times, rough railroad-men, and bullies in the Far West are gone, and there is as much civility there as you will find near home.

Railroad-tickets must always be shown when baggage is checked.

ROUTES.

Route No. 1 from New York.—Take the Pennsylvania Central Railroad, which leaves foot of Desbrosses street, by ferry, to Jersey City. To engage a good berth in your sleeping-car, go to a proper railroad-office and secure your berth by telegraph. There are local telegraphs connected with the principal Pullman office. Do this the previous night or morning, as then the best berths can be secured. Pullman cars run on the Pennsylvania Railroad to Chicago and St. Louis, direct, without change. Three trains leave per day. To see the richest scenery, take the *morning train*, and you will have a good view of nearly the entire State of Pennsylvania by daylight, the valleys of the Susquehanna and Juniata, and the famous Horseshoe Bend by moonlight. The Pennsylvania Railroad is *always on time*, the most reliable in its connections.

It may not be amiss to state that the emigrant-cars are well furnished in all particulars, and equal, if not superior, to any other line, this being the most popular route. We here subjoin a list of rates of fare to various points:

	First Class.	Time.	Special.	Time.	Emigrant.
New York to St. Paul, Minn.	$[illegible],	32 hours.	$34.00,	5 days.	$24.10
" " Dallas, Tex.	57.15,	69 "	50.15,	6 "	38.20
" " Denver, Col.	64.25,	50 "	58.75,		41.55
" " Kansas City	37.25,	46 "	22.75,	5 days.	21.55
" " San Francisco	138.00,	6½ days.	100.00,	second class.	65.00
" " Portland, Or.	158.00				75.00
" " Helena, Mon.					68.50

Route No. 2 from New York.—Leave *viâ* the Erie Railroad from foot of Chambers or West Twenty-third street. The advantages of this route are numerous. This is the famous Pullman line, which ran the first line of dining-cars between New York and Chicago. The meals are very fine and service excellent. The sleeping-cars on the Erie Railroad belong to the Pullman Company, and are the finest in the world, of extra width and extra comfort. The scenery along the Erie Railroad (by all means take the morning train) is specially fine, and at points is remarkably lovely. The sleeping- and dining-cars accompany the train to Chicago. The route passes *viâ* Salamanca, Atlantic and Great Western, and Chicago extension of Baltimore and Ohio Railroad, direct, without change, to Chicago. Passengers also can take other sleeping-cars of the train if they wish, which will convey them direct to Buffalo and Niagara Falls, where there is direct connection *viâ* the Lake Shore Railroad or Michigan Central to Chicago.

Route No. 3 from New York is *viâ* the New York Central and Hudson River.

Route No. 4 is *viâ* the Baltimore and Ohio Railroad. Tourists by this route to and from California have many advantages. It is *the shortest* line from Chicago or Cincinnati to the National Capital at Washington. Its scenery, on the mountain-division between Harper's Ferry and Parkersburg, is grand and full of historic interest. Its dining-stations are exceedingly well kept, and the comforts of its parlor- and sleeping-cars are equal to the very best. Pullman cars run through to and from St. Louis and Chicago.

California travellers choosing this route East will include Washington, Baltimore, Philadelphia, and New York in one ticket, with their numerous scenes and objects of interest.

From Philadelphia tourists uniformly prefer the Pennsylvania Central, though many often wish to visit Baltimore and Washington, and thence see the scenery along the Baltimore and Ohio Railroad, and go westward *viâ* Cincinnati to St. Louis.

From Baltimore and Washington tourists have choice of either the Northern Central, with Pennsylvania Central connections, or the Baltimore and Ohio Railroad. Pullman cars run on both roads.

From Boston.—Wagner sleeping-cars run direct over the Boston and Albany Railroad to Rochester, N. Y., and usually through to Chicago. Though this is an exceedingly convenient route, yet it gives no scenery of consequence. Tourists who desire the best scenery will do well to come direct to New York, the ride by steamer being always pleasant, and from New York make their start, the pleasantest time for departure always being on the fast special express in the morning.

From Cincinnati tourists have choice of two routes: First, *viâ* Ohio and Mississippi Railroad, direct to St. Louis, passing over the famous St. Louis Bridge, with omnibus transfer to other railroads; or, second, *viâ* Indianapolis, Bloomington, and Western Railroad, which runs trains direct to Burlington, Ia., or to Chicago. This is one of the best through-lines West, and enjoys unusual favor with the travelling public. The equipments of the road are all first class, and passengers will find all the comforts of railroad travel. Pullman sleeping-cars run on either route.

From Chicago three roads run across Iowa direct to Council Bluffs:

The Chicago, Burlington, and Quincy Railroad crosses the Mississippi at Burlington, Ia., and passes through Southern Iowa. The Pullman cars are very elegant and the road is popular. This line is now running dining-cars attached to its express-trains on both the Eastern and Western divisions. Meals served on them are splendid, beautifully cooked, have great variety, and are a great comfort to the traveller. Price, only seventy-five cents.

The Chicago and North-western Railroad is the shortest line, and crosses the Mississippi at Clinton, Ia. The eating-stations on this route are all very fine; in Iowa, especially, they are the best on the Iowa railroads. The Pullman cars are also very superior. There has recently been added a magnificent hotel-car to express-trains, which increases the popularity of the line very greatly.

The Chicago and Rock Island Railroad crosses the Mississippi at Davenport. The view from the railroad bridge is very beautiful, and the scenery of the railroad in the Des Moines Valley and westward is charming. The sleeping-cars on this line are owned by the railroad company, and are very good. The line has recently added some elegant and expensive restaurant- and dining-cars, whose fine meals are exceedingly well served. Price, only seventy-five cents.

Note.—Upon railroads west of Chicago no sleeping-cars run through except those connected with the morning Pacific express-train. These run direct from Chicago to Council Bluffs, where passengers will change cars for the Union Pacific Railroad.

Sleeping-Car Expenses.—The tariff to travellers is as follows with all companies:

One berth, New York to Chicago, one and a half days, by any route	$5 00
One berth, New York to Cincinnati, one and a half days, by Pennsylvania Railroad	4 00
One berth, New York to Cincinnati, one and a half days, by other routes	5 00
One berth, New York to St. Louis, two days, by any route	6 00
One berth, Chicago or St. Louis to Omaha, by any route	3 00
One berth, Omaha to Ogden, by Pacific Railroad	8 00
One berth, Ogden to San Francisco, by Central Pacific Railroad	6 00

RATES OF FARES TO CALIFORNIA.

To San Francisco or Sacramento from—	Viâ Omaha.		
	First Class.	Second Class.	Third Class.
Albany or Troy, N. Y.	$126 15		
Atlanta, Ga.	140 65		
Austin, Texas	144 70	....	$72 10
Baltimore, Md.	136 00	$102 50	62 00
Bellefontaine, O.	124 00		
Bloomington, Ill.	114 05		
Boston, Mass.	142 85	110 00	66 00
" viâ N. Y. City	142 85	111 85	66 00
Buffalo or Niagara Falls, N. Y.	130 00	90 00	
Burlington, Iowa	109 35		
Cairo, Ill.	122 90		
Cedar Rapids, Iowa	106 60		
Charleston, S. C.	151 35		
Chattanooga, Tenn.	135 90		
Cheyenne, Wy. T.	100 00		
Chicago, Ill.	116 05	88 00	58 50
Cincinnati, O.	128 85	96 00	62 50
Cleveland, O.	126 00		
Clinton, Iowa	111 00		
Columbia, S. C.	146 90		
Columbus, O.	125 40		
Crestline, O.	124 60		
Dallas, Tex.	136 45	....	68 35
" viâ St. Louis	140 45		
Danville, Ill.	116 90		
" viâ St. Louis	120 00		
Dayton, O.	123 45		
Davenport, Iowa	110 00		
Decatur, Ill.	115 60		
" viâ St. Louis	119 35		
Denison, Tex.	122 45	....	66 95
Detroit, Mich.	124 00		
Dubuque, Iowa	111 75		
Dunkirk, N. Y.	129 55		
Evansville, Ind.	121 85		
Fort Scott, Kan.	115 80		
Fort Wayne, Ind.	120 45		
Galveston, Tex.	161 45	....	72 90
viâ St. Louis	145 45		
Halifax (from Boston), N. S.	15 00		
Harrisburg, Pa.	135 00		
Houston, Tex.	130 45	....	70 95
" viâ St. Louis	140 45		
Huntsville, Ala.	135 40		
Indianapolis, Ind.	119 85	88 75	59 75
Kansas City, Mo.	110 90		
Keokuk, Iowa	109 25		
Knoxville, Tenn.	130 65		
La Crosse, Wis.	115 85		
Lafayette, Ind.	116 70		
Little Rock, Ark.	132 90		
Logansport, Ind.	119 75		
Longview, Tex.	140 45		
Louisville, Ky.	$123 40	$96 00	
Lynchburg, Va.	143 90		
Mansfield, O.	124 70		
Memphis, Tenn.	130 00		
Milwaukee, Wis.	118 10		
Mobile, Ala.	137 50		
Montreal, Can.	139 70	104 00	$66 00
" viâ Suspension Bridge or Buffalo	140 80		
Montgomery, Ala.	141 50		
Nashville, Tenn.	128 40	97 00	64 50
Newark, O.	125 90		
New Orleans, La.	139 00	105 00	65 00
" viâ Galveston	153 45		
New York, N. Y.	136 00	106 25	65 00
Ogdensburg, N. Y.	136 00		
Omaha, Neb.	100 00	75 00	45 00
Parkersburg, Va.	129 55		
Peoria, Ill.	112 00		
Peru, Ind.	120 40		
Philadelphia, Pa.	136 00	104 00	62 50
Piqua, O.	128 35		
Pittsburg, Pa.	130 00	98 50	
Portland, Me.	139 85	108 00	66 00
Quebec, Can.	140 50	105 00	66 00
Quincy, Ill.	111 10	86 10	55 50
Richmond, Va., viâ Cincin. and C. & O. R. R.	136 00		
" viâ Washington	141 25		
" viâ Nashville	145 50		
Richmond, Ind.	122 90		
Rouse's Point, N. Y.	141 00		
Savannah, Ga.	152 90		
Selma, Ala.	143 00		
Springfield, viâ St. Louis, Ill.	117 25		
Springfield, Mo.	126 20		
St. John (from Boston), N. B.	10 00		
St. Louis, Mo.	116 00	88 00	58 50
St. Paul, Minn.	115 25	90 25	60 25
Terre Haute, Ind.	118 75		
Texarkana, Ark.	140 00		
Toledo, O.	125 00	94 00	
Tolono, viâ St. Louis, Ill.	119 80		
Urbana (or Champaign), Ill.	115 70		
Urbana, O.	124 10		
Vicksburg, Miss.	137 50		
Washington, D. C.	135 80		
Watertown, N. Y.	135 15		
Wheeling, Va.	129 80		
White Sulphur Springs, Va.	133 10		
Winona, Minn.	116 10		
Zanesville, O.	126 70		

Children under twelve years of age, half-fare. Children under five years of age, free.

Baggage will be allowed at the rate of one hundred pounds for each whole ticket, and for all over that amount there will be charged fifteen cents per pound between Omaha and San Francisco, and about six cents between New York and Omaha.

N. B. The above rates of fare are by the most direct routes to and from Pacific railroads.

RATES OF FARE VIÂ UNION PACIFIC RAILROAD.

FROM OMAHA TO—	First Class.	Second Class.	Emig't.
Fremont, Nebraska	$2.85		
North Bend, Nebraska	3.10		
Schuyler, "	3.80		
Columbus, "	4.60		
Grand Island, "	7.70		
Kearney Junc., "	9.90		
Plum Creek, "	11.50		
North Platte, "	14.55		
Julesburg, "	18.85		
Sidney, "	22.15		
Cheyenne, Wyoming	31.00	$24.00	
Laramie, "	36.30		
Evanston, "	70.80		
Ogden, Utah	77.50	60.00	$40.00
Salt Lake City, Utah	79.50	62.00	42.00
Corinne, Utah	79.25	61.75	41.75
Virginia City, Montana, viâ Stage from Franklin.	118.50	97.00	73.50
Deer Lodge, Montana, viâ Stage from Franklin	126.75	101.75	78.50
Helena, Montana, viâ Stage from Franklin	126.75	101.75	78.50
Kelton, Utah	85.00	67.50	45.00
Boise City, Idaho, viâ Stage from Kelton	119.50	100.50	60.00
Silver City, Idaho, viâ Stage from Kelton	124.50	112.50	80.00
Baker City, Oregon, viâ Stage from Kelton	124.00	112.50	80.00
La Grande, Oregon, viâ Stage from Kelton	124.00	112.50	80.00
Walla Walla, Wash. T., viâ Stage from Kelton	125.00	113.50	80.00
Umatilla, Oregon, viâ Stage from Kelton	125.00	113.50	80.00
Dalles, Oregon, viâ Stage from Kelton	128.00	118.50	80.00
Portland, Oregon, viâ Stage from Kelton	130.00	119.50	80.00
Portland, Oregon, viâ Stage from Redding	$143.00	$118.00	$68.00
Portland, Oregon, viâ Stage from S. Francisco	125.00	100.00	57.00
Elko, Nevada	94.25	75.00	45.00
Palisade, "	95.00	75.00	45.00
Battle Mountain, Nevada	96.00	75.00	45.00
Winnemucca, "	96.00	75.00	45.00
Reno, "	98.00	75.00	45.00
Virginia City, Nev., viâ V. & T. R. R. from Reno	101.50	78.50	48.50
Truckee, Nevada	99.00	75.00	45.00
Colfax, California	99.00	75.00	45.00
Marysville, California	100.00	75.00	45.00
Sacramento, "	100.00	75.00	45.00
Stockton, "	100.00	75.00	45.00
Lathrop, "	100.00	75.00	45.00
Los Angeles, Cal., viâ Rail and Stage from Lathrop.	120.00	95.00	55.00
San José, California	100.00	75.00	45.00
San Francisco, California,	100.00	75.00	45.00
Custer City, in the Black Hills, viâ Stage from Cheyenne	45.00	35.00	25.00
Sidney	40.00	32.00	25.00
Grand Island	25.00	20.00	15.00
FROM NEW YORK TO—			
Omaha, Nebraska	38.00		
Cheyenne, Wyoming	68.00		
Denver, Colorado	73.00		
Lincoln, Nebraska	40.75		
Ogden, Utah	115.50		
Pueblo, Colorado	73.00		
Salt Lake City, Utah	117.50		
Walla Walla, Washington.	162.00		
Chicago to Omaha, Neb	16.00		
St. Louis to Omaha, "	16.00		

INFORMATION TO EMIGRANTS.

From Chicago, West, emigrants are carried on the regular first-class express-trains, and make the same time as passengers who hold first-class tickets. The cars that are used by emigrants are good, clean, well-lighted coaches, with upholstered seats and backs, and are as good as the coaches furnished by many roads to first-class passengers.

Emigrant Trains West of Omaha.—The trains carrying emigrants on the Union and Central Pacific roads west of Omaha are made up of comfortable coaches, nicely cushioned, and far better in every way than the emigrant-cars of the Atlantic seaboard roads. The passengers are not crowded in the cars, but plenty of room is given. Sleeping arrangements have been provided on the Central Pacific, and are similar to regular sleeping-coaches, but not upholstered. The time of these trains is about twelve miles per hour, which, making the time from Omaha to San Francisco by emigrant-trains about eight to nine days, gives passengers by them ample time to see the country as they move through it. Emigrants can get meals at the regular eating-stations along the line, or they can carry cooked provisions with them, and buy coffee or tea at the eating-houses and eat on the train.

Emigrants' movables can go on the same train taken by emigrants from Omaha, as through freight-cars are attached to emigrant-trains.

Neither second-class passengers nor emigrants can have Pullman sleeping-car accommodations, and in this lie about all the restrictions that are placed on them.

Emigrant Tickets are limited as to time, being good between Chicago and Omaha for eight days from and including day of sale. At Omaha you exchange this ticket for one of the Union Pacific Railroad issue, good for nine days from and including day of exchange. No "stop-over checks" are issued on second-class or emigrant tickets.

The difference in time between express- and emigrant-trains from Omaha to San Francisco is about five days.

SPECIAL RATES OF FARE FOR EXCURSION-PARTIES ON PACIFIC RAILROADS.

The Union and Central Pacific Railroads will receive excursion-parties at the following rates for first-class passage on the regular trains:

OMAHA TO SAN FRANCISCO AND RETURN.

In parties of 10 each	$180.00
" 15 "	175.00
" 20 "	170.00
" 25 "	165.00
" 30 "	160.00
" 35 "	155.00
" 40 "	150.00
" 45 "	145.00
" 50 "	140.00
" 55 "	135.00
" 60 to 75 each	130.00

These rates are available for such organizations as Free Masons, Odd Fellows, religious, medical, scientific, and other associations; for hunting- and fishing-parties, tourists, pleasure- and health-seekers who may organise parties in the same neighborhood.

All arrangements for excursions to California must be made in advance with the general ticket department at Omaha, and a full list of names furnished, with proposed date of departure from this point.

In all cases excursion-tickets to points beyond Odgen and Salt Lake must be purchased at Omaha, as only the issues of the Union Pacific Company will be recognised for excursions over the Central Pacific. These tickets will not be transferable, and will be limited to thirty, sixty, or ninety days, according to previous arrangement. The number of excursionists for each train is limited to seventy-five.

TRANS-CONTINENTAL TIME-TABLES AND TRAVELLERS' GUIDE.

THROUGH EXPRESS-TRAIN TIME WESTWARD.

LEAVE Boston 5.00 P. M.	LEAVE New York 8.00 P. M.	LEAVE Philada. 11.55 P. M.	LEAVE Baltimore 10.00 P. M.	LEAVE Cincinnati 7.00 P. M.	LEAVE Chicago 10.00 A. M.	LEAVE St. Louis 9.00 A. M.	LEAVE Omaha 11.00 A. M.	LEAVE Ogden 6.15 P. M.	ARRIVE Sacram'to 10.75 A. M.	ARRIVE San Fr'sco 5.35 P. M.
Sunday, Monday, Tuesday, Wed'sday, Thursday, Friday, Saturday.	Sunday, Monday, Tuesday, Wed'sday, Thursday, Friday, Saturday.	Sunday, Monday, Tuesday, Wed'sday, Thursday, Friday, Saturday.	Monday, Tuesday, Wed'sday, Thursday, Friday, Saturday, Sunday.	Monday, Tuesday, Wed'sday, Thursday, Friday, Saturday, Sunday.	Tuesday, Wed'sday, Thursday, Friday, Saturday, Sunday, Monday.	Tuesday, Wed'sday, Thursday, Friday, Saturday, ... Monday.	Wed'sday, Thursday, Friday, Saturday, Sunday, Monday, Tuesday.	Friday, Saturday, Sunday, Monday, Tuesday, Wed'sday, Thursday.	Sunday, Monday, Tuesday, Wed'sday, Thursday, Friday, Saturday.	Sunday, Monday, Tuesday, Wed'sday, Thursday, Friday, Saturday.
Miles to S. Francisco, 3413	3344	[illegible]	3139	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	140	

DIFFERENCES IN TIME.

Passengers travelling between New York and San Francisco, etc., having New York time, will find upon arrival at the following places their time too fast by hours and minutes as indicated in the following schedule:

	Min.		Hours.	Min.		Hours.	Min.
Philadelphia, Pa.	4	Detroit, Mich.		35	Laramie, Wy.	2	7
Harrisburg, Pa.	12	Jackson, Mich.		41	Rawlins, Wy.	2	15
Pittsburg, Pa.	26	Kalamazoo, Mich.		46	Green River, Wy.	2	23
Crestline, O.	34	Chicago, Ill.		55	Evanston, Utah	2	29
Fort Wayne, Ind.	45	Mendota, Ill.		60	Salt Lake City	2	37
Logansport, Ind.	50	Galesburg, Ill.	1	5	Ogden, Utah	2	32
Utica, N. Y.	5	Burlington, Ia.	1	8	Corinne, Utah	2	33
Syracuse, N. Y.	7	Ottumwa, Ia.	1	14	Promontory, Utah	2	36
Rochester, N. Y.	15	Omaha, Neb.	1	25	Kelton, Utah	2	38
Binghamton, N. Y.	8	Fremont, Neb.	1	30	Toano, Nev.	2	42
Elmira, N. Y.	11	Lincoln, Neb.	1	31	Elko, Nev.	2	45
Buffalo, N. Y.	19	Grand, Island	1	37	Battle Mt., Nev.	2	52
Dunkirk, N. Y.	22	Kearney, Neb.	1	40	Humboldt, Nev.	2	55
Erie, Pa.	26	North Platte, Neb.	1	47	Wadsworth, Nev.	3	1
Cleveland, O.	31	Sidney, Neb.	1	58	Summit, Cal.	3	6
Norwalk, O.	35	Cheyenne, Wy.	2	3	Sacramento, Cal.	3	10
Toledo, O.	38	Denver, Col.	2	4	San Francisco.	3	14
Niagara Falls, N. Y.	20						